

HORTICULTURAL ABSTRACTS

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No. 1

The initialised abstract and review are by R. J. Garner and H. Wormald of the East Malling Research Station respectively. It is regretted that by force of circumstances, not only is this number late and very slender, but also it contains more than its share of abstracts on papers published some time ago. These papers have only recently become available to the Bureau.

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MISCELLANEOUS

Technique.

1. TAUSSON, W. O., PROKOFIEV, A. A., AND PONTOVICH, W. E. 578.084.1
Sterile cultures as a method for studying metabolism in higher plants.

C.R. Acad. Sci. U.R.S.S., 1944, 42: 131-4, bibl. 17.

A simplified method has been evolved for the study, in sterile cultures, of heterotrophic nutrition problems in higher plants. Seeds were sterilized in a 10-12% solution of H_2O_2 (20 minutes) and washed under sterile conditions. The culture on solid substrata in an ordinary laboratory vessel and in liquid media with the installation of special capsules is described. For the study of carbon sources and for some other purposes the following modification of Knop's medium is recommended: $Ca(NO_3)_2$, 0.1 g.; KNO_3 , 0.025 g.; $MgSO_4$, 0.025 g.; $Fe_2(SO_4)_3$, 0.001 g.; H_2O , 100 cc.; KH_2PO_4 and K_2HPO_4 , 0.025 g. Sugars may be added up to 2%, organic acids 0.002-0.05% and organic nitrogen in amounts required by the investigation. Growth was found to be satisfactory only within a narrow range of pH values, 7.0-7.8 in the case of tau saghzy. Plants grown in the dark, which proved even more susceptible to the acidity of the medium, were greatly benefited by the addition to the medium of supplementary growth factors, such as yeast extracts or metabolic products of some fungi. The joint cultivation of a higher plant and a fungus in a wide-mouthed Erlenmeyer flask is also described.

2. ANDERSON, A. J. 578.084.1
Double-compartment pot cultures for studies in plant nutrition.
J. Coun. sci. industr. Res. Aust., 1944, 17: 144-50, bibl. 11.

In this double-compartment method of culture the plants grow in a top compartment containing soil, through which the roots can penetrate to a compartment containing solution below. An automatic irrigator is used to maintain the moisture level in the soil. In the tests discussed the

effect of phosphate dressings on lucerne plants was successfully investigated.

3. ANDERSON, A. J. 631.548: 631.432: 578.084.1
An automatic irrigator actuated by a soil-moisture tensiometer.
J. Coun. sci. industr. Res. Aust., 1944, 17: 151-6, bibl. 22.

An illustrated description is given of the irrigator used in double-compartment pot cultures. This irrigator delivers a known volume of water each time the soil moisture tension reaches a predetermined maximum value, as measured by a tensiometer.

4. KLOTZ, L. J. 578.084.1
A simplified method of growing plants with roots in nutrient vapors.

Phytopathology, 1944, 34: 507-8, bibl. 5.

A simplified method of growing plants with roots in nutrient vapours for the study of *Phytophthora* infections and of the toxic effect of nitrite and other ions on citrus and avocado roots has been evolved at Riverside. The apparatus is described and illustrated and its merits and possible uses are enumerated.

5. HIGGINS, V. 631.531
On the germination of difficult seeds by the amateur.
J. roy. hort. Soc., 1944, 69: 340-4.

The results of recent research on seed germination are briefly reviewed. Discussion is then directed to the best methods for the amateur with neither time, material, nor laboratory at his disposal to employ in dealing with a small supply of seed, the pretreatment of which may be unknown to him.

6. JANÍŠEVSKÝ, D. E., AND PERYUHINA, N. V. 631.531.16
Prolonging the life of seeds which lose their viability quickly. [Russian.]

Sovetsk. Botan., 1941, No. 3, pp. 80-6.
Seeds of *Salix caprea*, which normally retain their viability

for 30 to 40 days, may be enabled to prolong it to 200 or more days by drying the seeds for 24 hours at 22° C., coating with paraffin just as it is about to harden, and keeping at a temperature of 6° to 9° C. The paraffin used in the experiment had a melting point of 48° C., this being necessary to avoid damaging the seeds by higher temperatures.

7. HIBBARD, R. P. 535.243: 581.192
The detection, distribution and mobility of certain elements in the tissues of plants growing under different conditions as determined by the spectrographic method.
Tech. Bull. Mich. agric. Exp. Stat. 176, 1941, pp. 30, bibl. 48.

The ash of ether-, acetone- and water-soluble extractions from various tissues was examined spectroscopically for potassium, calcium, magnesium, phosphorus, iron and manganese.

8. BOROVICK-ROMANOVA, T. F. 581.192: 535.33
On the content of rubidium in plants. I.
C.R. Acad. Sci. U.R.S.S., 1944, 43: 163-5, bibl. 14.

The rubidium content is given of a number of sea-weeds and fresh water plants, expressed as per cent. of ash, per cent. of fresh weight and Rb/K ratio. The determinations were made by means of spectrum analysis.

9. JENSEN, H. L. 582.6
Bacteriological tests on agar made from Australian seaweed.
Bull. imp. Inst. Lond., 1944, 42: 69-74, being *Papers from Australia* 214.

The author comes to the conclusion that the locally manufactured agar from the seaweed *Gracilaria confervoides* is satisfactory for almost any bacteriological work. Its advantages and disadvantages in comparison with Japanese agar are set out.

10. ROHWER, C. 631.62 + 631.67
The use of current meters in measuring pipe discharges.

Tech. Bull. Colo. agric. Exp. Stat. 29, 1942, pp. 40.

The measurement of water pipe discharges by the aid of the Hoff and the Ott propeller current meters has proved reasonably accurate, provided the necessary corrections are made. The experiments are described, drawings of the apparatus provided, and the formulae worked out. The discharge cannot be measured unless the pipes flow full. A measurement and computation should take 15 minutes.

11. IPATJEV, A. N. 631.521
Accurate morphological methods for studying varieties.

C.R. Acad. Sci. U.R.S.S., 1944, 42: 401-3, bibl. 4.

For a more accurate and convenient description of intravarietal variation two precise morphological methods are suggested: (1) The comparative ontogenetic method consisting in the comparison of corresponding organs at the stage of their full development; (2) the method of diagrams recording the order of appearance of organs on a plant in the course of its development. On the same graph, the differences in the expression of a given organ are also recorded. Two diagrams showing the development of two cucumber plants illustrate the suggestion.

12. RODENBURG, J. W. M. 612.014.44
Das Verhalten von Pflanzen in verschiedenfarbigem Licht. (The behaviour of plants submitted to different types of light.)

Rec. Trav. bot. néerl., 1940 (publ. 1941), 37: 301-76, from abstract *Forschungsdienst*, 1943, Vol. 15, abstr. p. 77.

If artificial light treatment is applied to young tomato plants the temperature in the greenhouse should be lowered to 13° C. during the night to avoid chlorotic spots on the

leaves. Mercury light was inferior to other sources of light as a promoter of growth. Strawberries, which require long-day treatment in October for normal flower production in winter, gave the best response to incandescent lamps among the low-intensity treatments but failed to respond to mercury light. Good fruit development, however, was only achieved with high-intensity illumination. Long-day treatment during the early stages produced very early flowering in Chinese asters.

13. SALYT, M. S. 581.144.2
S. S. Hohlov's rhizograph. [Russian.]
Sovetsk. Botan., 1941, No. 4, pp. 108-11.

Certain improvements described in this article have been made in the rhizograph described by Hohlov in No. 3, 1941, of this journal. The pencil is brought into play more easily than in the original design; and there is a movable glass screen to enable certain difficulties caused by the broken horizontal surface of the soil in which the roots are being traced to be overcome.

14. LIU, CH.-H. AND LOU, CH.-H. 581.163: 635.1/7
Fluorescein-induced parthenocarpy.
Nature, 1945, 155: 23, bibl. 10.

Fruits answering in all descriptions to parthenocarpic fruits have been induced in cucumber at the Physiological Laboratory, Tsing Hua University, Kunming, by the application of a lanolin paste of 1% fluorescein to stigma and cut styles of protected female flowers, and smaller seedless parthenocarpic fruits were later induced in luffa, egg plant and pepper. At low concentrations (1: 2,000,000) fluorescein is known to promote plant growth and general development. High concentration (0.5-3%) dwarfs the plant. It is suggested that if, as has been shown by Muir (*Amer. J. Bot.*, 1942, 29: 716-20; *H.A.*, 13: 480), the initiation of fruit development by pollen may be an indirect one, growth hormones being liberated from inactive combinations in the ovary after the pollen tube has been introduced, fluorescein dyes might do the same. The plant used has a tendency to yield parthenocarpic fruits. Experiments on parthenocarpy should be extended to other dyes, chemicals and even to mechanical treatment.

15. ALEKSANDROV, V. G. 576.312: 631.535
The biology of the cell nucleus of plants, and the physiological nature of the callus tissue in cuttings. [Russian.]
Sovetsk. Botan., 1943, No. 6, pp. 17-25.

The survival of the plant cell after the elimination of the nucleus is not rare and has been observed in tissues where nutrients are stored, e.g. in the cortex and callus tissues of *Rhododendron ponticum* and in the seed endosperm of *Agropyron cristatum*. The process of elimination, as observed in the callus tissue of cuttings from *R. ponticum*, consisted in the nucleus being engulfed by crystals of calcium oxalate. The cells containing the crystals were observed always to be in the immediate vicinity of the root initials, and it is thought that the nutrition of these initials by the substances in the surrounding callus tissue is facilitated by the elimination of the nuclei. There is, in fact, a certain resemblance between cortical and callus tissue on the one hand and the endosperm on the other; both store nutrients and both supply with these nutrients the requirement of growing roots, shoots and embryos.

16. JOHN INNES HORTICULTURAL INSTITUTION. 631.462
John Innes composts and soil sterilisation for pot plants.
John Innes Leaflet, 1 (3rd edition*), 1943, pp. 7, 6d.

In this third edition the essential instructions remain unaltered. The two paragraphs dealing with the theory and results of sterilization have been rewritten. It is noted that owing to war restrictions supplies of fertilizers used in the

* 2nd edition (designated *Leaflet*, 1 and 2) noted only *H.A.*, 11: 654.

composts are uncertain. A supplementary page is enclosed showing how best some of the consequent difficulties can be met and listing certain firms who may be able to supply ingredients.

17. JOHN INNES HORTICULTURAL INSTITUTION. 631.462

The John Innes soil steriliser.

John Innes Leaflet. 3 (3rd edition), 1943, pp. 7, 6d.

The third edition of this leaflet shows a few alterations from the second edition (noted only, *H.A.*, 11: 654), in the list of materials required and in the actual wording of certain instructions, which makes for greater clearness, but essentially it remains unaltered. A plea is uttered that information should be sent to the Institution on results achieved with the sterilizer.

18. JOHN INNES HORTICULTURAL INSTITUTION. 631.53

Soil ingredients of the John Innes compost.

John Innes Leaflet. 6, 1944, pp. 7, 6d.

The leaflet gives detailed instructions on the selection and preparation of the soil ingredients—loam, peat (or leaf-mould) and sand—which should be used in making up the John Innes composts. A good turf loam is the ideal loam. Instructions are given on the stacking, rotting and general handling of the turf before sterilization. As regards peat, one with a pH between 4.0 and 5.0 is preferable, though the precise degree of acidity is not apparently of great importance, provided it is not less than 3.5. For leaf-mould, if peat is not available, though leaves of oak and beech are traditionally the best, those from other trees are probably equally good. Of sands, sea shore sand with its usual content of salt and lime is unsuitable. The colour is of no importance. A good sand is coarse, clean and relatively lime-free. Of all the ingredients the loam is the most important and, if this is of good quality, variations among peats and sands are largely smoothed out.

19. KOBERIDZE, A. V. 577.15.04: 631.535

A comparison of the action of heteroauxin on the rooting of cuttings from various species. [Georgian, with summaries in Russian and English.]

Trudy Tbilisskogo Botaničeskogo Instituta (Travaux de l'Institut Botanique de Tbilissi), 1940, 7: 81-197.

Heteroauxin from the U.S.A. and from local sources at Suhumi was compared. In the experiment, which lasted four months, cuttings were taken in August from the following species and rooted both in sand and water: *Morus alba*, *Olea europaea*, *Populus pyramidalis*, *Nerium oleander*, *Populus euphratica*. At a concentration of 0.12:300, 35% of the cuttings of *Morus alba* took root under the influence of the American heteroauxin and 33% under that of the Suhumi product. At a concentration of 0.12:600 the corresponding values were found to be 17% and 28% respectively. Both samples, particularly that from Suhumi, in comparison with the untreated control, were effective in causing *N. oleander* to root. Poplar cuttings in water and in sand, were affected to a similar degree by both samples. The American heteroauxin brought about rooting only in 8% of cuttings of *Olea europaea*, whereas the Suhumi product and the control cuttings produced no roots. *Populus euphratica* reacted similarly to the two products.

20. GROZDOV, B. 577.15.04: 631.535

The influence of growth-substances on the root-formation of cuttings from woody plants. [Russian.]

Sovetsk. Botan., 1941, No. 3, pp. 149-52.

At the beginning of July cuttings of lilac, *Prunus* spp., *Euonymus*, birch, *Larix*, *Lonicera* and other species were immersed for 24 hours in heteroauxin which had been dissolved in alcohol and diluted with distilled water to a concentration of 0.01% to 0.05%. They were next planted 0.5 cm. deep in a layer of sand 5 cm. deep overlying a compost mixture. Watering, frequent at first, was gradually reduced. The tops of the frames in which the cuttings were being rooted were entirely removed at the end of 3 months.

The proportion of cuttings which struck root, and the length of the roots pruned showed that the effect of heteroauxin was successful on all the species used. Green cuttings immersed for 24 hours in a solution of $KMnO_4$ having a concentration of 0.01% to 0.1% reacted favourably in some cases only. The solution induced root formation in a large proportion of birch, *Larix*, and lilac cuttings, while, compared with the controls, it had a depressing effect on *Euonymus* and *Tilia*. But though rooting was induced, the length of the roots formed was not always satisfactory.

Nutrition.

21. SWABY, R. J.

581.14: 631.8

Stimulation of plant growth by organic matter.

J. Aust. Inst. agric. Sci., 1942, 8: 156-63, bibl. 42.

In a large-scale pot experiment under glasshouse conditions carried out by the Department of Agriculture, S. Australia, the growth of lucerne and *Phalaris tuberosa* was not stimulated by organic matter alone in the presence of adequate supplies of a complete mineral solution including minor elements. Presumably therefore any vitamins or hormones of vegetable or animal origin are not available or not useful to the plants. When soil micro-organisms are present in association with organic matter, stimulating and inhibiting substances are produced which may be identical, stimulating or depressing according to whether their concentration in the plant is low, as in fast growing plants, or high, as in slow growing plants. Small quantities of decomposing matter derived from plant roots and soil algae were found to stimulate growth as much as heavy applications of organic materials. Organic manure does not stimulate plant growth significantly as the result of the formation of organic growth factors, but the benefit derives from the resulting improved physical nature of the soil and from the extra minerals supplied, including minor elements.

22. SALISBURY, E. J.

631.8

Organic and mineral fertilizers.

J. roy. hort. Soc., 1944, 69: 287-90.

The director of Kew proves to be a persuasive debunker of fanatical theories and his article should be educative reading both to the artificial fertilizer maniac and to the ultra "muck minded" compost enthusiast. "Seen in its proper relation to the mineral nutrients the organic fraction is", he writes, "in no sense a substitute for them but a means *inter alia* of rendering them more effectively available."

23. JONES, R. F.

581.14: 577.15.04

Effect of some pure substances on plant growth.

Nature, 1944, 154: 828, bibl. 3.

The effect of swellings and growth inhibition in hypocotyls of dark-grown *Helianthus* produced by moderate and increased concentrations of heteroauxin respectively is described as the result of a progressive disorientation of the cytoskeleton with corresponding loss of cell polarity. In the presence of the sodium salts of alizarin and quinizarin sulphonic acids higher concentrations of heteroauxin are required to produce similar effects. The effects of some other substances such as o-, m-, p-phenylene-diamine, etc., on the growth of oat roots are also briefly discussed. These substances are thought to prevent the development of the normal cytoskeleton by acting as molecular cross-linkages between the proteins of the embryonic cells. Normal extension of the cell would result from the action of auxins on the three-dimensional lattices of the cell wall and cytoskeleton.

24. ČAĽAČHJAN, M. H.

631.84: 581.144.4/5

Nitrogenous food as a factor increasing the rate of flowering and fruiting in plants.

C.R. Acad. Sci. U.R.S.S., 1944, 43: 75-9, bibl. 2.

Heavy applications of nitrogen were found to stimulate growth and to increase dry weight, but to inhibit flowering and fruiting in mustard and oats. Flowering and fruiting, on the other hand, were stimulated by a similar diet in *Perilla nankinensis*, millet, lupin and lettuce. Flower

production was not influenced by different levels of nitrogen in buckwheat, soya and hemp. The relation between the photoperiodic reaction of a plant and its response to nitrogen requires further investigation.

25. RUSCHMANN, G., AND OTHERS. 631.8
Der Einfluss des Humusdüngers "Huminal B" auf das Pflanzenwachstum und die Bodeneigenschaften. (The influence of the humus fertilizer "Huminal B" on plant growth and soil properties.)
Landw. Jb., 1942, 92: 53-93, bibl. 24.

Huminal B is essentially peat freed from acid by the addition of NH_4HCO_3 . Further, 1.7% easily soluble nitrogen, 1.3% water soluble phosphoric acid and 2.1% K_2O are added to this fertilizer which contains 72% organic matter and 19.20% water. The ash percentage is 7.7. The paper, an extract from an unpublished and more detailed manuscript, is a progress report on trials determining the effect of Huminal B on plant growth and soil properties in comparison with other fertilizers. Potatoes, oats and maize served as test plants.

26. WILLCOX, O. W. 631.8
Absolute values in fertilizer experiments.
J. Amer. Soc. Agron., 1944, 36: 480-6, bibl. 8.

In conclusion of a series of articles on the use of the standard yield diagram in the interpretation of field experiments with plant nutrients, a particular example has been chosen to illustrate two common types of aberrancy in the results of field tests with fertilizers. Furthermore, this example presents a basis for comment on the misplaced use of statistical method in the evaluation of such field tests.

General.

27. RAFINESQUE, C. S. 58
A life of travels.
Chron. Bot., 1944, Vol. 8, No. 2, pp. 291-360, § 2.50.

A verbatim and literatim reprint of the original and only edition (Philadelphia 1836) of the travel life of the American naturalist, Constantine Samuel Rafinesque, 1783-1840, whose main study was botany, but whose unbridled tendency to propose and publish new genera and species thoroughly alienated his contemporaries, an alienation which has persisted among botanists to the present day. Of late years there has been a rerudescence of interest in Rafinesque, whose published bibliography exceeds 900 titles, now mostly inaccessible, and steps are being taken to make selected works available to a wider circle of working biologists. This reprint contains a learned foreword on the author's life and vagaries by E. D. Merrill, Administrator of Botanical Collections, Harvard University, and a critical index with explanatory comments by F. W. Pennell, Philadelphia Academy of Natural Sciences, of persons mentioned in the course of the Travels. Very few of the names mentioned by him have remained unidentified.

28. LEVICKAJA, A. M. 58.006(47) + 612.014.44
The botanical gardens at Dnepropetrovsk. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 191-4.

The general arrangement and the activities of the Garden at Dnepropetrovsk are described. Photoperiodism is among the phenomena being studied in the research department. Under its influence several varieties of dahlia flowered 15 to 33 days earlier than normal and chrysanthemums 45 to 88 days. The dahlias showed certain peculiarities in photoperiod. In the chrysanthemums there is evidence of some connexion between photoperiod and temperature. Vernalization, hormones, trace elements and other factors affecting the development of plants are also being studied.

29. BYKOV, B. A. 58(47)
A review of the research work of the Botanical Faculty of the Kazah (S. M. Kirov) State University. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 200-1.

The main published works since the foundation of the

University in 1934 and those still in manuscript are enumerated. They include some on horticultural subjects.

30. VESTAL, A. G. 581.6
Use of terms relating to vegetation.

Science, 1944, 100: 99-100.

Various terms applied to different types of vegetation in the mass are discussed, such as prairie, meadow, savannah, woodland, scrub, bush, maquis, chaparral, mesquite and others. In literature these terms are often loosely used with corresponding loss of accuracy. In this paper suggestions are made for their more precise application.

31. WHALEY, W. G. 581.14: 631.523
Heterosis.

Bot. Rev., 1944, 10: 461-98, bibl. 148.

A summary of present knowledge on hybrid vigour, namely the manifest effects of heterosis.

32. NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING.* 631.3.083/084
The farm tractor.†

Askham Bryan, York, 1943, pp. 41, 9d.

Tractor ploughing.†

Askham Bryan, York, 1944, pp. 41, 9d.

Since earlier publication of these brochures the Institute has changed its name and has moved from Oxford to Askham Bryan. The bulletins, which are considerably revised, are extremely well and copiously illustrated. They should be of great value both to the practical man and to the lecturer.

33. SISAM, J. W. B., AND WHYTE, R. O. 628.54: 581.6
Establishment of vegetation on coal tips and other spoil mounds.

Nature, 1944, 154: 506-8.

A preliminary discussion of the possibilities, now being seriously considered by reconstruction and planning authorities, of clothing unsightly and industrial spoil mounds with vegetation, preferably trees. A full statement of the information available from the literature and from local experience is shortly to be issued by the Imperial Agricultural Bureaux.

Noted.

34. BALL, E. 577.15.04
(17) The effects of synthetic growth substances on the shoot apex of *Tropaeolum majus* L.

Amer. J. Bot., 1944, 31: 316-27, bibl. 51.

BRILLIANT, V. A. 581.12
Rate of photosynthesis as affected by the method of dehydrating the assimilative tissue [in *Elodea densa*].

C.R. Acad. Sci. U.R.S.S., 1943, 41: 78-80, bibl. 6.

Photosynthesis as affected by the duration of water withdrawal from assimilating tissue [in *Potamogeton praelongus* and *Hibiscus rosa-sinensis*].

C.R. Acad. Sci. U.R.S.S., 1943, 41: 129-31, bibl. 2.

Effect of repeated dehydration on photosynthesis [in *Gossypium hirsutum*].

C.R. Acad. Sci. U.R.S.S., 1943, 41: 219-21, bibl. 5.

CHOUDNY, N. G. 581.11
Volatiles evolved by flowers and leaves as a source of nutrient for micro-organisms.

C.R. Acad. Sci. U.R.S.S., 1944, 43: 71-4, bibl. 4.

COMMITTEE OF PLANT RESOURCES ATTACHED TO THE ALL UNION COUNCIL OF ENGINEERING AND TECHNICAL SOCIETIES, MOSCOW. 633/635(47)

The utilization of plant resources of the U.S.S.R. [Russian.]

1943, pp. 53. Review in *Sovetsk. Botan.*, No. 3,

1944, pp. 49-50.

* Formerly Institute for Research in Agricultural Engineering.

† See also *H.A.*, 11: 1085.

CORNISH, E. A. 63: 519
The recovery of inter-block information in quasi-factorial designs with incomplete data. 2. Latice squares.
Bull. Coun. sci. industr. Res. Aust. 175, 1944, pp. 19, bibl. 12.

DE GROOT, G. 631.415
 Notions élémentaires sur le pH. Étude de vulgarisation. (The meaning of pH in simple terms, chiefly for agriculturists.)
Bull. agric. Congo belge, 1941, 32: 5-68, bibl. 7.

HOON, R. C., AND DHAWAN, C. L. 631.454: 546.711
 The occurrence and significance of trace elements in relation to soil deterioration. I. Manganese.
Ind. J. agric. Sci., 1943, 13: 601-8, bibl. 12.

LOO, T.-L., AND HWANG, T.-C. 581.162.3: 577.15.04
 Growth stimulation by manganese sulphate, indole-3-acetic acid and colchicine in pollen germination and pollen tube growth.
Amer. J. Bot., 1944, 31: 356-67, bibl. 33.

MARGOLIN, D. L. 581.9(47)
 Flora and vegetation of Tadžikistan. [Russian.]
 Edited by B. A. Fedčenko.
 Academy of Sciences U.S.S.R., Moscow and Leningrad, 1941, 346 pp., review in *Sovetsk. Botan.*, No. 3, 1944, pp. 48-9.

ODINZOVA, E. N. 577.16
 Synthesis of vitamin B₁ by cultivated yeasts from thiazole.
C.R. Acad. Sci. U.R.S.S., 1943, 41: 250-1, bibl. 3.

ODINZOVA, E. N. 577.16
 Accumulation of vitamin B₁ by yeast cells.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 129-30, bibl. 6.

PHIPPS, I. F., AND OTHERS. 63: 519
 The analysis of cubic lattice designs in varietal trials.
Bull. Coun. sci. industr. Res. Aust. 176, 1944, pp. 40, bibl. 14.

RATNER, E. I. 581.144.2: 631.414.2
 Interaction between roots and soil colloids as a problem of the physiology of mineral nutrition of plants. I. Unstable equilibria in the cation exchange between the roots of plants and the soil colloids.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 313-7, bibl. 11.
 II. Age variations in the fixing capacity of the plasm.
C.R. Acad. Sci. U.R.S.S., 1944, 43: 126-30, bibl. 10.

ROGOVSKOI, P. A. 581.9(47)
 Some additional information about the flora of the Krasnodar province. [Russian.]
Sovetsk. Botan., 1941, No. 4, pp. 66-70.

TREE FRUITS, DECIDUOUS

General.

35. RIGG, T. 633/635(931)
Agricultural resources of Waimea County, Nelson, N.Z.
 R. Lucas & Son (Nelson Mail) Ltd., undated, pp. 12.

Of this address to the Nelson Philosophical Society delivered by the Director of the Cawthron Institute, Nelson, N.Z. in July 1943, the following points may be of interest to the horticulturist and grower: *Tobacco*. Favourable climatic conditions, guaranteeing high yields and good quality, together with relative freedom from disease make an expansion of the Nelson tobacco industry desirable. More research on fertilizer requirements is bound to raise yields materially. *Tomatoes*. There is scope for an expansion of the glasshouse tomato industry in the Wood area, Nelson, which, with the Wellington market and the canning industry within easy reach, is more suitable for tomato growing than any other area in New Zealand. *Small fruits*. Since 1920 much of the acreage devoted to small fruits, particularly raspberries, has been transferred to tobacco. An expansion of the small fruit industry in the Tadmor-Motupiko and Sherry Valleys should be encouraged. *Apples*. The apple industry has experienced setbacks but may expect more favourable developments in the future. The author's confidence is based on the discovery made at the Cawthron Institute, that the vitamin C content of Sturmer apples is superior to that of tomatoes. Sturmer juice concentrates have both a high sugar (65-68%) and a high vitamin C content. The Sturmer variety is widely grown in Nelson orchards. Experience suggests that in the Nelson district Double Vigour and seedling rootstocks are superior for Sturmer and some other varieties to the Northern Spy rootstock. *Hops*. Yields could be increased by 20% with proper care. *Irrigation*. Irrigation of the Hope-Appleby section of the Waimea Plains would enable satisfactory development of stone fruits, tomatoes and other canning crops in that area.

36. DEPARTMENT OF AGRICULTURE AND FORESTRY, UNION OF S. AFRICA. 634.1/8(68)
Farming in South Africa, Special Fruit Production Number (Winter rainfall area), June 1943, 18: 374-484.

A symposium on fruit growing in the Union with an introduction by the director of the Western Province Fruit Research Institute, Stellenbosch. [It is regretted that owing to uncontrollable circumstances this exceptionally interesting number has only recently come to hand. Separate abstracts are given of nearly all the articles.]

37. DE VILLIERS, G. B. D. 634.1/8: 551.56
 Influence of climate upon fruit production.
Fmg S. Afr., 1943, 18: 378-81, 392, bibl. 3.

A deficiency in the cold requirements during the rest period of the deciduous fruit tree leads to delayed foliation associated with crop reduction. This is the climatic feature which has the greatest influence on yield in western Cape Province. A mean temperature exceeding 54° F. for the two winter months of June and July mean delayed foliage. On the basis of minimum temperatures for these months a classification of the western Cape Province fruit districts is given. Summer conditions determine fruit and keeping qualities. Pears require high (75°-80° F.) and apples comparatively low (65°-70° F.) summer temperature. To be at their best peaches require a mean temperature above 75° F. for December, January and February, plums one of 62°-68° F., apricots of 69°-73° F. The vine is least exacting as to range and does well with a summer range of 65°-75°F. The districts where these various optimum temperatures prevail are named. An annual rainfall of 25-30 inches is necessary; the apricot is the least susceptible to drought. There is reason to suppose that the tendency of winter temperatures in the western Cape Province will be to decrease for the next few years with consequent improvement of yields.

38. KOBEL, F., SCHMIDT, G., AND KESSLER, H. 634.1/7(494)
Der Schweizer Obstbau (Fruit growing in Switzerland.)

A. Francke A. G., Berne, undated, second edition, Fr. 5.25, from review *Schweiz. Z. Obst-u. Weinb.*, 1943, 52: 304.

The second edition of this textbook edited by the Agricultural Teachers' Association is said to incorporate the latest research results.

39. BRYANT, L. R., AND GARDNER, R. 634.23
Cultural factors affecting sour cherry production in Colorado.
Bull. Colo. agric. Exp. Stat. 471, 1942, pp. 19, bibl. 4.

Although the sour cherry is fairly tolerant of adverse soil conditions, good drainage, a deep penetrable subsoil, and top soils with sufficient natural fertility to grow fair grain or potato crops are desirable. The feeding of the trees plays little part in Colorado fruit soil management. Fertilizer trials showed nitrogen alone ($\frac{1}{2}$ lb. per tree) to give greatest increase on a normal fruit soil with stable manure next best (10 tons per acre). Fruit size is important, the canning trade insisting on at least $\frac{1}{2}$ in. diameter for U.S. grade No. 1. Moisture appears to be the limiting factor in fruit size. Size in Colorado can be greatly increased by irrigation shortly before the fruits reach maturity, when the entire area should be soaked to a depth of 4 to 5 ft. A late autumn soaking will do much to prevent winter desiccation. Although some moderate pruning is necessary, severe pruning greatly decreases yield. No pruning results in outside bearing only. 'Mahaleb' has been proved the best stock for sour cherry, especially in adverse environments.

Varieties.

40. JOHN INNES HORTICULTURAL INSTITUTION. 634.1/2: 581.162.3
The fertility rules in fruit planting.
John Innes Leafl. 4 (3rd edition), 1943, pp. 8, 6d.

The text remains essentially the same as in previous editions (H.A., 11; 45). One or two additions have been made to the lists in which (1) sweet cherries, (2) duke and sour cherries, (3) plums are grouped according to pollination capacity in relation to themselves or other varieties, and to the lists of triploid and diploid apples and tetraploid, triploid and diploid pears. The necessity is stressed when planting a triploid pear or apple of planting with it two or three diploids. The tetraploid pears are in a class by themselves, thus Fertility Improved sets a full crop with its own pollen.

41. HOOPER, C. H. 634.1/7-1.521
Varieties of fruit for commercial planting.
Fruitgrower, 1944, 98: 253-4.

The recommendations of a number of successful growers as to the most suitable varieties for commercial cultivation of apples, pears, plums and cherries are summarized. Brief comments are made on each of the varieties mentioned, particularly as regards their faults.

42. CROCE, M. 634.25
Importancia del duraznero y sus productos en Mendoza. (The importance of the peach and its products in Mendoza province, Argentina.)
Rev. B.A.P., 1944, 27: 322: 53, 55, 57, 59-62.

There are about 11 million peach trees in Argentina, of which over 4 million according to one census and 3 million according to another (both 1942) are grown in Mendoza, which ranks second to Buenos Aires for number of trees. The chief variety grown is Montevideo Amarillo followed by Royal George and there are at least 23 other popular varieties grown for dessert or for drying.

43. CONSTANTINESCU-ISMAIL, N. 634.22: 581.162.5(49.8)
Contributiuni la studiul autofertilitatei si interfertilitatei la diferitele varietati de pruni. (Contributions to the study of self- and inter-fertility in different plum varieties.)
Hort. Românească, 1939, 17: 9/10: 2-4.

Selfing and artificial pollination of bagged, emasculated flowers of 17 varieties of plum showed that Reine Claude Noire is completely self-sterile, Tuleu Gras almost self-sterile, with only 10% set or less from selfing, and Bistrita, Bosnia, Agen, Ana Späth, Quetsche d'Italia, Ontario, Queen Victoria and Muscata de Ungaria are self-fertile; no fruit was set from the combinations Bistrita \times Bosnia, Muscata de Ungaria \times Bistrita and Muscata de Ungaria \times Reine Claude Noire. Good pollinators for Tuleu Gras are Bistrita, Agen, Quetsche d'Italia and Reine Claude d'Althan and for Reine Claude Verde, Tuleu Gras, Bistrita, Bosnia and Quetsche d'Italia. No case of parthenocarpy was observed but xenia occurred in Tuleu Gras pollinated by Reine Claude d'Althan, the fruits being larger than usual. In pollinations with pollen of *Prunus spinosa*, the variety Agen set no fruit whilst Queen Victoria, Reine Claude Noire and Dulci de Tuică did. The full results are tabulated.

44. MEIER, K., AND BRYNER, W. 634.22
Zimmers Frühzwetschge. (A zwetschen variety.)
Schweiz. Z. Obst-u. Weinb., 1941, 50: 429-33, bibl. 4.

A description and illustrations are given of a zwetschen variety known as Zimmers Frühzwetschge and often mentioned in German fruit papers. It is largely self-sterile and a number of suitable pollinators are listed.

45. BLACK, M. W. 634.1/8(68)
Uneconomical deciduous fruit varieties.
Fmg S. Afr., 1943, 18: 382-7.

The number of unprofitable fruit trees in S. Africa is excessive; there are too many inferior varieties and too many varieties admirable in their own countries but unsuited to S. African conditions. Seventy different kinds of peach are grown in the winter rainfall area, of which about a dozen are worth the trouble. Of the 40 pear varieties only 6 are named as being satisfactory, and most of these have local idiosyncrasies. The solution for pears, apples and plums is the elimination of the unprofitable kinds by top-working, preferably stub-grafting provided the tree is vigorous, but peaches and apricots only pay for top-working if fairly young. With them the best method is to cut back heavily and bud the subsequent shoots in summer. The Fruit Research Institute, Stellenbosch, is conducting variety and breeding trials.

46. KOERNICKE, M. 577.16
Zur Kenntnis der mährischen "süssen" Eberesche, einer wertvollen, natürlichen Vitamin-C-Spenderin. (The Moravian "sweet" mountain ash, a valuable natural source of vitamin C.)
Dtsch. Heilpfl., 1943, 9: 249-54.

The berries of the "sweet" Moravian mountain ash (*Sorbus aucuparia* var. *moravica*) are, in contrast to those of the common mountain ash, not bitter, but of excellent flavour, for which the presence of malic acid is responsible. The vitamin C content of the berries from a specimen at Bonn showed values up to 103 mg. %, their provitamin A content being 29-31% per g. of fruit. Loss of vitamin C in crudely prepared juice after storage was small. Further observations that the tree thrives well in mountain localities up to 1,800 m. which are unsuitable for other fruit and that it is comparatively frost resistant made its large scale introduction in Germany desirable. The tree is now being raised commercially in certain big nurseries on the common mountain ash and *Crataegus* as rootstocks.

TREE FRUITS, DECIDUOUS

47. DU PREEZ, D.

The olive.

Fmg S. Afr., 1943, 18: 393-5.

Wild olives flourish in the coastal belt of S. Africa and cultivated olives could easily be grown. The best S. African varieties are Leccino, Lucca (Razza) for oil and Spanish Queen (Sevillano) for pickling. The famous Mission olive of California does well in S. Africa. Old wild olive trees should be top-worked. The method advocated is to saw off the trunk 4 ft. from the ground and to bark-graft on the 5 or 6 scaffold limbs that remain. Selected shoots from the many that will emerge and must be removed may be budded to replace any unsuccessful grafts. Since olives are imported very cheaply planting should only be done on a limited scale, on land unsuited economically to other crops, and expenses should be kept to a minimum.

Propagation.

48. BRYANT, L. R., AND BEACH, G. 631.53

Propagation of plants.

Bull. Colo. agric. Exp. Stat. 468, 1941, pp. 26, bibl. 1.

This bulletin, a revision of *Bull. 441*, is written for the practical man. It describes propagation by seed and by vegetative methods. The necessary conditions for seed germination are listed and the best methods of sowing seed of various kinds, indoors and outside, are briefly described. Vegetative methods receive considerable attention, and cover hardwood-, softwood- and root-cuttings, and leaf- and tuber-cuttings, but it may be noted that the benefits obtained by using roots from young plants are not mentioned. The practical use of growth substances in propagation is handled clearly and concisely. Simple forms of layering are briefly described, but not the useful etiolation method. Various forms of separation and division are detailed and increasing bulbil formation by cutting, notching or scoring the parent bulb is noticed. Practical methods of grafting such as whip-and-tongue and shield-budding in the nursery and topworking by cleft-, bark- and veneer- or channel-grafting and also bridge-grafting are clearly described and well illustrated. Three wax formulæ, and the wax treatment of string and bandages, are given. The writers urge the collection of scions whilst dormant, and the proper choice, care and use of tools and accessories. R.J.G.

49. AFANASIEV, M. 631.531: 634/635

Propagation of trees and shrubs by seed.

Circ. Okla. agric. Exp. Stat. C-106, 1942, pp. 43, bibl. ca. 70.

The recommendations given in this bulletin, which contains illustrations of a number of fruit trees and shrubs, are largely based on the author's own experience and research. The subject is treated under the following headings: Causes and treatment of delayed germination; seed planting for fruit trees, small fruit, nut trees, ornamental and shade trees, ornamental shrubs; general bibliography on propagation by seeds. A list of selected references on each species follows the discussion of that species.

50. DORAN, W. L., AND BAILEY, J. S.

634.22-1.535

Propagation of beach plums by softwood cuttings.
Reprint *Amer. Nurserym.*, 1942, 76: 6: 7, being *Contr. Mass. agric. Exp. Stat.* 452.

A second note on the propagation of beach plum by softwood cuttings.

Reprint *ibidem*, 1943, 78: 8: 7-8, being *Contr. Mass. agric. Exp. Stat.* 496.

Commercial cultivation of beach plum, *Prunus maritima*, which so far has only been used locally for preserving, is now being considered in Massachusetts. As a result of a study carried out at the Agricultural Experiment Station the following method of vegetative propagation is recommended: in early June, i.e. when the diameter of the green fruit is

634.63

about $\frac{1}{8}$ in., take 2-4 in. long cuttings from short sideshoots, and make the basal cut at the base of the growth of the current year. After a simple powder dip treatment with Hormodin No. 1, the most successful of the hormone treatments tested, the cuttings should be inserted in sand in a greenhouse, the roof of which is whitened. The temperature should be kept down to 90° F., high relative humidity being the most important factor. Forty per cent. of the cuttings in the trial rooted after 3-4 weeks, 80% after 7-8 weeks. Softwood cuttings of myrobalan B rootstock, taken in early July, rooted 68% in 3-4 weeks after a 24-hour treatment with 0.125% naphthaleneacetic acid.

51. INGRAM, C.

631.535: 634/635

*A successful experiment with hardwood cuttings.**

J. roy. hort. Soc., 1944, 69: 309-10.

The author gives an account of an experiment in which he successfully rooted cuttings of the following plants: two cherries viz. a *Prunus incisa* \times *campanulata* hybrid, and *Prunus prostrata*, *Styrax japonica* var. *fargesii*, a hybrid rhododendron and *Viburnum furcatum*. Cuttings of these were in the third week in July inserted into a medium of mixed live sphagnum moss and sand in a "moraine" (or double-walled) pot. The pot was then half plunged in a bed of damp sand, covered with a shaded bellglass and left. On 12 August, having received no attention in the meantime, the cherry cuttings had rooted and started growth and the others had either calloused or were actually forming roots. It is noted that the cherry cuttings were taken in a somewhat greener condition than is usual.

52. INGRAM, C.

634.23-1.541

Summer and autumn grafting.

Gdns' Chron., 1944, 116: 160.

It is reported that stub-grafting of different species of cherries was very successfully done in August. The method employed showed a modification of the standard method in that the lateral branch, into which the scion is inserted, is not cut back, while the graft is bound round with raffia instead of being covered with wax.

53. DE WET, A. F.

634.1/8-1.541.5

The budding of deciduous fruit trees.

Fmg S. Afr., 1943, 18: 405-8.

Differences of opinion in regard to the details of technique in budding deciduous fruit are worldwide. Some of these are discussed in the light of S. African experience and experiment. *T* versus *inverted T* in shield budding. Experiments at Stellenbosch in 1936 with maiden pears showed no differences in take or grade of tree. The bud shield should, for ease of insertion, be cut from the basal side of the bud on the bud stick when using the upright *T* incision and from the terminal side when using the inverted *T*. *Tying material.* Rubber strips and raffia compared at Stellenbosch on pears showed no differences in take percentage. Nursery labour is used to raffia and its continued use is advised here. *Wood chip at back of bud shield.* In England and Europe, but not in U.S.A., the custom is to remove the wood from the bud just before insertion. Trials at Stellenbosch produced no differences in take percentage. The removal of a large number of chips per day would consume an appreciable amount of time, the chip stiffens the bud shield and allows it to be pushed under the stock more easily. For these reasons retention of the chip is recommended. *Extent of heading back the budded tree.* The main object in leaving a long stub is to form a support to which the growing bud can be tied. Experiments with various deciduous fruits over a period of years showed strikingly that buds on stocks headed back to bud level pushed earlier and more uniformly than those with 3-inch stubs, a distinct advantage. Further, the time spent on second year care of trees cut hard back was only a third of that spent on stubbed trees. There was no difference in wind injury or distortion between the two methods.

* Or preferably "cuttings of hardwood subjects" as noted by the author in subsequent issue of journal.

Rootstocks.

54. THOMAS, L. A. 634.11: 581.144.2
Stock and scion investigations. III. The root-systems of some own-rooted apple trees.
J. Coun. sci. industr. Res. Aust., 1944, 17: 167-78, bibl. 6.

Own-rooted apple trees were got by layering and were planted as 1-year-old shoots after trimming back all roots to 3 inches. The earlier plantings in July 1936 were made at 3 ft. apart in rows 5 ft. apart, the second series in July 1937 at 4 ft. apart in rows 5 ft. apart, and the third series in 1939 at 4½ ft. apart in rows 3 ft. apart. There were 3 trees of each variety in the first two series and 4 in the third. Some of the 39 varieties were planted in more than one series. The soil is of granitic origin, showing in profile a grey sandy layer (0-7 in.) above a buff or yellow-brown sand (7-13 in.), followed by a deeper coloured brown sand (13-19 in.) and then by a yellow-red sandy clay (19-30 in.) and a red and white cemented clay layer. The root growth in each case is described. Wide differences were found in the lateral spread of the roots, their penetration in depth, the number of main roots formed, the size of trees produced and the ratio by weight of shoot to root growth.

55. PROZOROVSKÝ, A. V. 58.006(47)
The botanical section of the Tadzhik branch of the Academy of Sciences U.S.S.R. [Russian].
Sovetsk. Botan., 1941, No. 3, pp. 187-91.

Since the establishment of a botanical garden and several subsidiary stations in Tadzhikistan, the flora of the country has been searched for species of useful and decorative application. Volume 5 (*Leguminosae*)—the first of ten volumes of a Flora—has been issued. Among the useful plants discovered are *Polygonum bucharicum* containing 30% of tannides and *Scorzonera kirghisorum*, equal to tau saghyz. It is proposed to utilize as stocks for grafting the many specimens of *Amygdalus bucharica*, which grow wild on the rocky mountain slopes, as well as *Cotoneaster racemiflora* and *Crataegus turkestanica*. The sweet almond, peach and plum have already been successfully grafted on the first of the above-mentioned species, and the apple and plum on the second and third. Rocky land which would normally be useless is thus being made to yield fruit.

Pollination.

56. RUCKÍ, I. A. 638.155
The relativity of adaptation, and the evidence of disteleology in the flower of *Asclepias cornuta* Decne. [Russian].
Sovetsk. Botan., 1943, No. 5, pp. 23-38.

Discussion here centres on the mortality among insects, and bees in particular, which visit crops of this plant while in flower. The author reaches the conclusion that the losses suffered by the bee-keeper on account of the bees which are trapped or injured by the flower are more than counterbalanced by the quantity of honey collected.

57. SCHWAN, B. 638.12: 632.951/2
Bina och skadedyrsbekämpningen. (Bees and pest control.)

Växtskyddsnotiser, 1944, Nr. 4, pp. 61-3.

Heavy losses of bees resulting from arsenic poisoning cause the author to suggest that rape pests should be controlled by traps or Gesarol only and that arsenical dusts should be avoided.

Manuring and cultural practice.

58. ANON. 634.1/7-1.8
The orchard fertility problem during the war emergency.
Bull. Pa agric. Exp. Stat. 431, 1942, pp. 12.

Thirty-four years of tests in apple orchards have proved that trees are not in need of commercial nitrogen fertilizers where

legume sod is kept under proper control or annual legume cover crops are ploughed under in spring and immediately reseeded. Lime, phosphate and potash should be added in specified quantities. With cover crops other than legume or with insufficient legume covers, the nitrogen requirements should be satisfied by ring applications. In the case of a peach orchard, trials have shown that annual legume covers will reduce the amount of nitrogenous fertilizers required.

59. SUDDS, R. H. 634.11-1.84
Tests of four nitrogen-carriers in a mature apple orchard at Martinsburg, West Virginia.
Bull. W. Va agric. Exp. Stat. 315, 1944, pp. 23, bibl. 13.

Chilean nitrate of soda, sulphate of ammonia, and Uramon may be expected to produce equally satisfactory results as sources of nitrogen for direct application to apple trees in West Virginia, provided lime is used as necessary with the sulphate and the Uramon to prevent excessive acidity. Cyanamide is safe for use as a nitrogen-carrier for direct application to apple trees in West Virginia orchards under a much narrower set of environmental conditions than Chilean nitrate, sulphate of ammonia, or Uramon. Cyanamide should preferably be applied in the autumn before the soil freezes, and should be distributed over the whole surface. The amounts per unit of soil surface recommended by the manufacturers should not be exceeded.

60. DAVIDSON, O. W. 634.25-1.83
The translocation of potassium among peach roots.
Soil Sci., 1944, 58: 51-9, bibl. 10, being *J. ser. Pap. N. J. agric. Exp. Stat.*

By the use of special double-chambered sand cultures which enabled the separation of peach roots into two distinct horizontal layers, it was possible to apply potassium to one layer of roots without contamination of the others. The results of these studies have shown that potassium may be absorbed by one layer of roots and may be translocated vertically up or down through the root system rapidly and in considerable quantities to other roots receiving no external supply of this material. [Author's summary.]

61. KRIEL, P. E. 631.874: 634.1/8
Green manuring of vineyards and orchards.
Fmg S. Afr., 1943, 18: 417-22.

The value of green manuring in various directions is pointed out. The poorness of cover crops in S. African orchards is attributed (1) to lateness of winter rain which retards germination of the crop, so that it is not ready for ploughing in at ploughing time; (2) to poor soils, especially on irrigated soils because irrigated trees make full use of the soil reserves, particularly nitrogen, and so starve the cover crop. In experiments at Paarl non-irrigated plots produced twice as much dry matter as plots irrigated only once; (3) to pests and diseases. The application of cover cropping to local soils of the Western Province is then discussed.

62. MEIER, K. 634.1/7-1.4-1.862
Untersuchung obstbaulich benützter Böden aus der Gemeinde Wädenswil. (Tests of orchard soils in the Wädenswil district.)
Schweiz. Z. Obst-u. Weinb., 1943, 52: 269-79, 289-92.

Four samples were examined from three soil layers (0-20, 20-40 and 40-60 cm.) in the rooting area of 40 fruit trees in the Wädenswil district where the application of liquid manure is practised. Potash and phosphoric acid were found to be seriously deficient, particularly in the 20-40 cm. layer, which contains the main body of roots, and in the deepest layer. The tabulated data and diagrams show clearly that liquid manure treatment requires supplementary potash and phosphate applications.

TREE FRUITS, DECIDUOUS

63. VAN NIEKERK, P. E. LE R. 631.67: 634.1/8
The irrigation of fruit trees and vines.
Fmg S. Afr., 1943, 18: 413-6, 438.
 The irrigation of orchards and vineyards for the production of high quality fruit under the climatic and soil conditions of Western Cape Province is a matter which requires understanding of the local sub-soil conditions and is by no means to be done by rule of thumb. The difficulties likely to arise and the best way of dealing with them are explained

64. HILTON, R. J. 634.11-1.55-1.542.27
Apple thinning with chemical sprays.
Eightieth A.R. Nova Scotia Fruit Growers' Ass.
 1943, 1944, pp. 101-7, bibl. 4.
 The author used a 0.5% water solution of Elgetol on Wagener apple trees at Kentville at full bloom. This resulted in a reduction in number of apples by 58.8% and in total weight of crop by 36.3%, with an increase in individual apple weight of 52.5% over the controls. Two to four blossoms per cluster were destroyed and young foliage was severely scorched. The trees quickly and fully recovered and made more terminal growth than the controls. The effect of the spray was correlated with tree vigour. Thus trees receiving the greatest amount of fertilizer suffered the least reduction in crop and those receiving the smallest amounts of fertilizer showed the greatest.

65. BLACK, M. W. 634.1/8-1.542-1.542.27
Pruning and thinning of deciduous fruit trees.
Fmg S. Afr., 1943, 18: 401-4, 412.
 The need for adequate pruning in S. African deciduous orchards is stressed. Influence on fruit size is shown by an experiment on the University Fruit Farm, Stellenbosch. Over a 5-year period unpruned Santa Rosa plums showed 6.8% fruit over 1½ in. diameter and 45.6% below 1½ inch (i.e. under legal packing size), whereas pruned trees produced 30% top size and only 7.5% unpackable. A few years later practically the entire crop of the unpruned trees was below grading size. Neglected Royal apricots, showing a very low yield, increased their yield by 80% the second year after pruning had recommended. The economic advantage of fruit thinning with high labour costs depends on the relative prices of high and low grade fruit, since greater fruit size is set off by reduced yield.

66. RUEDIGER, J. B. 631.542: 634.1/3
Pruning of fruit trees.
J. Dep. Agric. S. Aust., 1944, 47: 561-2.
 It is suggested in this paper, which was read at a branch meeting of the Agricultural Bureau of South Australia, that the unhealthy state of many fruit trees in the Rowland Flat district is due to hard pruning, unhealed cuts and deep ploughing. The shortening back of water shoots and fruit twigs is condemned. The former should be cut right out, the latter either left or also entirely removed, if cutting is required. Apricots grown on fruit twigs will produce the best quality fruit and the twigs will keep the tree shaded. Orange trees should be pruned from the inside and treated like a shrub, with the main arms and stem shaded and the eaves sweeping the ground. No cultivation should take place under the trees.

67. KLANG, C. 634.11-1.536
Omplantering av äldre träd. (Transplanting of older trees.)
Fruktdlaren, 1944, No. 5, pp. 163-6.
 The successful transplanting on a big scale of 6- and 7-year-old dwarf apple trees is recorded and the necessary precautions are described. The operation was carried out in the autumn at Alnarp and on a commercial estate, the losses being nil and negligible respectively. Two years after transplanting the majority of the trees were in full production. They were pruned severely in the first spring, after which they were only thinned. Leaders should not be cut

back in subsequent years, particularly those with flower buds in the terminal bud.

Harvesting.

68. VAN DOREN, A. 634.11-1.55: 664.85.11
Apple harvest and storage.
Amer. Fruit Gr., Sept. 1944, pp. 8-9, 18.
 Some harvest and storage problems of apples are briefly discussed. Much loss is caused by untrained workers. A good fruit farm should run its own training programme. Hand thinning as a check to biennial bearing is impracticable. Blossom thinning by spraying with dinitro-cresol in very dilute solution the first day of full bloom is now done fairly extensively in New York State. The centre flowers and others, which open a day or so before the majority of buds on the truss, are not injured and can set their fruit. The flowers which have been open only a few hours are destroyed. Hence timing is important. Peaches can also be successfully treated and do not suffer from the slight leaf injury that affects apples. Concentration of dinitro-cresol (Elgetol) varies with the peach variety. For instance a 21.6% set on the control trees of Elberta was reduced to 10.7% on the sprayed trees with ½ pint per 100 gal. water and to 3.9% when the concentration was 1½ pints per 100 gal. With Valiant the ½ pint concentration reduced a 12.7% set to 1.7% or far below a normal commercial crop. Rough handling and various labour saving methods to ensure speed in getting apples quickly from the picking bag to cold storage are discussed. Keeping quality is fully retained by fruit that can be cold stored the same day as picked. Delay reduces keeping period and brings about various storage troubles. Preharvest hormone spray is mentioned as delaying preharvest drop. Control of shrivel and scald in stored apples may be obtained by waxing the fruit at harvest with an appropriate wax emulsion. At Cornell University filtering the storage air through brominated, activated charcoal gave excellent control of scald. This air conditioning technique is under extensive commercial trial, using 90,000 bushels, in New York State, both in cold and unrefrigerated stores. Besides the control of scald and removal of fruit-ripening gases the various storage room odours which impair flavour may also be eliminated. Rome Beauty and McIntosh respond particularly well to controlled atmosphere storage; the former has been kept thus in good condition for two years; Wealthy and Jonathan give adverse response.

69. HILTON, R. J., AND SPURR, C. 634.11-1.55: 577.15.04
The influence of late picking on McIntosh apples.
Seventy-ninth A.R. Nova Scotia Fruit Growers' Ass., 1942, 1943, pp. 87-96, bibl. 4.
 Late picking of McIntosh apples resulted in considerable improvement in size and quality in the picked fruit. In trials at the Kentville Experimental Station spraying with two commercial growth substance preparations prevented dropping to a large extent and allowed apples to remain on the tree till they had acquired optimum size and colour.

70. HILTON, R. J. 634.11-1.55: 577.15.04
A further note on pre-harvest spraying and delayed picking of McIntosh apples.
Eightieth A.R. Nova Scotia Fruit Growers' Ass.
 1943, 1944, pp. 95-101, bibl. 6.
 Although the author received reports from several growers of the satisfactory use of growth substance sprays to delay preharvest fruit fall the weather proved too great a handicap in the 1943 Kentville trials and only inconclusive results, largely due to damage caused by high winds, were achieved. Delayed picking trials were also similarly disturbed, but nevertheless gave results closely parallel to those of the previous year, thus considerable increase in weight (21%) occurred between first and second pickings and between second and third, namely 7%.

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71. PEARSE, H. L. 634.1/7-1.55

Control of pre-harvest drop of fruit.
Fmg S. Afr., 1943, 18: 442.

Apples and pears can be held on the trees and the preharvest drop reduced by spraying with α -naphthaleneacetic acid, 4.5 g. dissolved in 1 pint 95% alcohol and added to 100 gal. water. The spray is applied just as fruit drop is beginning, the use of spreaders being unnecessary. The substance acts more quickly when applied during high temperatures and remains effective up to 15 days. A second spray may be given later if required. The treatment will not prevent the drop that follows fruit set. A medium sized tree requires 10-15 gallons.

72. REYNEKE, J., AND PEARSE, H. L. 634.1/8-1.55

Influence of picking time and handling on quality of fruit.
Fmg S. Afr., 1943, 18: 431-7.

Fruit picked too early, besides being undersized, tends to shrivel in storage as the lenticels are not corked over and the protective waxy bloom not developed. Thus it loses water more rapidly than in the more mature condition. Degree of firmness of flesh as judged by the pressure tester is an indication of correct picking stage, provided the pressure peculiar to each variety is known. Colour develops poorly in the dark, hence the fruit must be left to colour on the tree as long as possible. When picked green fruit from slow ripening districts colours much better in store than the same variety from quick ripening districts. Juice content should be high at picking. With late peaches there is a temporary stage of dryness just before ripening when the juice content may drop to 10% or lower. If the fruit is placed in cold storage for longer than 3 weeks at this stage it will emerge woolly. Peaches should, therefore, not be cold stored till they are past this stage. Fruit, especially grapes, peaches and plums, if picked too early, never attain their full flavour in store. The sugar/acid ratio is a good test of ripeness for grapes because they have no reserve of carbohydrates in the form of cane sugar or starch. With plums and peaches, which contain reserve cane sugar, the test is not infallible. The iodine test for apples is briefly mentioned. The most useful tests for picking maturity of grapes, peaches, Cape plums, pears and apples are described. Handling, storage and transport are discussed. Scald in pears and apples is increased by careless handling, overlong

treatment with hydrochloric acid or the use of certain wetting agents such as Areskap. Pears from cold storage quickly blacken when removed to a high temperature. Bon Chretien pear develops its best flavour at 60° F. Scald and shrivelling of pears and apples, which have been stored for long in a cold temperature, can be greatly reduced if the fruit is dipped in 5% pea-nut (*Arachis*) oil solution just before packing. If, however, the fruit is from a bitter-pit area, e.g. Elgin, a lower concentration, 2%, must be used. Oil (summer oil emulsion will do if *Arachis* is not available) cannot be used when the fruit is not cold stored. The need for ventilation in store is explained. The detrimental effects on the fruit of the emanations in unventilated store is pointed out, namely, CO_2 gives a sharp alcoholic taste, ethylene hastens ripening and acetaldehyde and amyl esters cause skin damage and scald.

73. DU TOIT, M. S., AND REYNEKE, J. 634.1/8
Orchard practice and fruit quality.
Fmg S. Afr., 1943, 18: 423-5.

Fruit quality is dependent on how and where the fruit is grown, the degree of maturity on picking, and conditions of handling, transport and packing. In this paper the first is discussed, and it is shown how climate, including delayed foliation which is a climatic effect, soil fertility and soil moisture influence the state of the fruit when it finally reaches the distant consumer.

Noted.

74. FEDČENKO, I. 634.1/7

(3) Orchard management. [Russian.]
Sovoznoe Proizvodstvo, 1943, No. 9, pp. 15-6.
Elementary instructions.

HOOPER, C. H. 638.12: 581.162.3
The importance of hive bees and other insects in fruit production.
J. roy. hort. Soc., 1944, 69: 345-6.

SPRENG, H. 634.1/8-1.542
Neuzzeitliche Kronenpflege der Obstbäume. (The Oeschberg method of pruning fruit trees.)
Verbandsdruckerei A. G., Bern, undated, third revised edition, Fr. 1.60, from review *Schweiz. Z. Obst-u. Weinb.*, 1943, 52: 288.
See also *H.A.*, 14: 80.

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75. MICKLEM, T. 634.7/15

Berry fruits [in S. Africa].
Fmg S. Afr., 1943, 18: 389-92.

At present there is a high demand for berry fruits in S. Africa. Instructions are given for the cultivation under local conditions of strawberries, brambles and Cape gooseberries (*Physalis* sp.). Whiteheart and Laxton's Noble are the principal strawberries grown. Leopold de Tardive, if cross-pollinated, has done well in the Research Institute variety trials. Strawberries are only cropped for one season, i.e. in the summer following planting. The most successful brambles in the Western Province are the Logan, Low, Young and Boysen berries. The Cape gooseberry is propagated by seed and requires a well manured sandy loam.

76. VINCENT, C. L. 631.453: 635.1/7+634.7

Vegetable and small fruit growing in toxic ex-orchard soils of central Washington.
Bull. Wash. Agric. Exp. Stat. 437, 1944, pp. 31, bibl. 8.

The rehabilitation of 12,000-15,000 acres of ex-orchard soil in central Washington, the top 5 in. of which had accumulated an arsenic-toxic soil complex, most of it being unsuitable for replanting to tree fruits, was studied by the Washington Agricultural Experiment Station. Of the crops under trial asparagus, tomato, carrot, tobacco, dewberry, grape and red raspberry have shown the greatest tolerance to water soluble arsenic, while snap beans, lima beans, onions, peas

and cucumbers proved very susceptible, maize, beets, summer and winter squash and strawberries being intermediate if planted in heavy texture and medium heavy texture soils. In the case of raspberries, grapes and dewberries the good results may be due to the roots being placed below the most toxic layer on planting. Both tolerant and semi-tolerant crops were greatly benefited by the ploughing under of two or more crops of green rye previous to planting. The beneficial effect of cow manure became manifest at a somewhat slower rate. Although applications of ammonium phosphate were also found to reduce the amount of water-soluble arsenic in the soil, the response of the plants was poor, probably owing to the fact that the chemical is more toxic to roots in the absence of organic matter. Generally, crops growing in clay and clay loam soils were less affected by a certain concentration of water-soluble arsenic than those growing in medium heavy and light sandy soils. Other observations pointed to varietal differences in tolerance.

77. DORAN, W. L., AND BAILEY, J. S. 634.73-1.535

Propagation of the high-bush blueberry by soft-wood cuttings.
Bull. Mass. agric. Exp. Stat. 410, 1943, pp. 8, bibl. 6.

Cuttings of the high-bush blueberry, *Vaccinium corymbosum*, were found to root more rapidly and to respond better to treatments if taken on 1 July than later. In sand-peat,

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untreated cuttings and cuttings treated with Hormodin No. 1 or No. 2 rooted 100% and 96% in 12 and 9 weeks respectively when taken 1 July and 48% and 64% respectively in 15 weeks when taken 15 July. To hasten the rooting of cuttings in sand-peat, the optimum medium, the following treatments are recommended as a result of trials: (1) Cuttings taken 1 July: Indolebutyric acid, 25 mg./l, 17 hours; (2) cuttings taken 15 July: Indolepropionic acid, 100 mg./l, 5 hours or 25 mg./l, 20 hours.

78. THERON, C. J. 634.8

The place of the vine in mixed farming.

Fmg S. Afr., 1943, 18: 426-7, 438.

Under S. African conditions vineyards would benefit greatly by forming part of a mixed farm, rather than being cultivated alone. The vines should be wider spaced allowing of the cultivation of fodder and vegetable crops between them. Any damage to the vines resulting from cultivation of these subsidiary crops is only temporary and in any case will be offset by the value of the extra crop. The vegetable crops can only be grown from winter to early summer because of overshadowing. The use of cattle manure, as in former days when cattle were abundant, would do much to save soil exhaustion resulting in poor crops and the onset of pests and diseases. Milk, cheese and butter are always in good demand, whereas there is [in South Africa] always a surplus of wine.

79. TISCORNIA, J. T. 634.8: 551.51: 632.4

Ensayo para un estudio de las relaciones bio-ambientales en la vid e influencia de las mismas en los rendimientos. (The effect of climate on yield of grape vines.) [English summary 13 lines.] *Rev. Asoc. Ing. agron. Montevideo*, 1944, 16: 2: 35-46.

The results are presented of 10 years of study of the effect of climate on the yield of one variety of vine (la Harrigue) in Uruguay. The yields are closely related to conditions of heat and humidity, but the greatest effect on yield is produced during years when fungus diseases, more especially mildew, are prevalent. Since these diseases require heat and moisture for their propagation it can be said that directly or indirectly climatic conditions are of fundamental importance to yield.

80. PEYER, E., AND HUBER, H. 634.8-1.541.11

Neuanlagen mit veredelten Reben. (New plantings of grafted vines.)

Schweiz. Z. Obst-u. Weinb., 1943, 52: 279-84, being *Flugschr. eidg. Versuchsanst. Obst-, Wein-u. Gartenbau, Wädenswil* 47.

Recommendations as to varieties, rootstocks, soil prepara-

tion, planting and cultivation, and costing of vines during the first year.

81. SEFICK, H. J., AND CLARK, J. H. 634.8-1.542
Pruning grapevines.

Circ. N.J. agric. Exp. Stat. 423, 1942, pp. 8.

Pruning grapevines according to the single trunk 4-cane Kniffin system was found to be the most satisfactory method in Tennessee and other States. The trellis consists of two wires, 30 and 60 in. above the ground. The pruned vine is composed of a single permanent trunk extending to the top wire and a one-year-old cane trained in each direction on each wire. Summer pruning is not recommended.

82. SCHEURER, — 634.8-1.67
Die Bedeutung der Walliser Bisses für die Rebberge. (The significance of the irrigation system in the vineyards of Valais.) *Schweiz. Z. Obst-u. Weinb.*, 1941, 50: 336-8.

This extract from a lecture describes the ancient and picturesque irrigation system in the Canton of Valais, which with a length of about 1,750 km. covers an area of about 200 square kilometres. Some of the canals are fed by glaciers and rise to more than 2,700 m. above sea level, the majority receiving their waters at a height of 1,200-1,800 m. Vine-growers in the Valais entirely depend on irrigation, their turn being decided by lot.

83. ELIODORO LEMBO, F. 634.87
(4) Contribución al estudio del aprovechamiento de los subproductos de la uva. (Vine by-products.) *Reprint No. 32 from Rev. Fac. Agron. Montevideo*, May 1943, pp. 36, bibl. 12.

LEYVRAZ, H. 634.8-1.542
Les différentes tailles de la vigne telle qu'elles se pratiquent en Suisse romande. (Vine pruning methods in French-speaking Switzerland.)

Kantonales Weinbauamt Sitten, 1942, pp. 43, Fr. 1.60, from review *Schweiz. Z. Obst-u. Weinb.*, 1943, 52: 304.

ROGERS, W. S., AND BUTFIELD, J. M. 634.75-1.533

Production of healthy strawberry runners. Methods recommended for special stock nurseries.

Fruitgrower, 1944, 98: 156, 160, 200, 206, 238, 243, bibl. 7.

For abstract of same article published elsewhere see *H.A.*, 14: 1552.

TOMALIN, T. E. 634.7
Bush and soft fruits for the private garden.

J. roy. hort. Soc., 1945, 70: 29-31.

Mainly hints on varieties.

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84. THOMPSON, C. R. 634.1/2-2.19

Correcting mineral deficiencies in fruit trees.

Market Gr., 1944, 22: 42: 12, 13, and 22: 43: 15.

The author advises fruitgrowers who have reason to suspect that their trees are suffering from mineral deficiencies to consult their county advisory officers. If particular mineral deficiencies are diagnosed they should then apply a remedy which consists of injecting the necessary mineral salts in pill form into the tree trunk. He gives the detail of a technique based on a method described by J. P. Bennett of California in 1931 and modified by workers in Kent, England. He shows with diagrams how to make the holes and insert the pills. Roughly speaking the holes should be about 3 inches apart or one hole for every inch of the stem diameter. They should not be made in a straight line round the stem, but should be staggered at different heights. The pills, obtainable in this country, supply 1 g. of the required salt, and are $\frac{1}{8}$ in. in diameter. For the correction of iron deficiency they are made of ferrous sulphate and to

cure manganese deficiency manganese sulphate is used. The dosage suggested, which may be expected to last 4 years, is as follows: For a stem 3-6 in. in diameter 1 pill in each of 3 to 6 holes; for 6-10 in. stems 2 pills each in 6 to 10 holes; and for 10-20 in. stems 3 pills each in 10 to 20 holes. They should come to rest in the stem next to the heart wood and not next to the bark or sap wood.

85. HILL, H. 631.811: 634/635: 632.19
The role of minor elements in fruit and vegetable production.

Eightieth A.R. Nova Scotia Fruit Growers' Ass. 1943, 1944, pp. 87-95.

The author discusses boron deficiency symptoms as seen in drought spot, internal cork, corky-core and dieback in apples, recommending borax soil treatment. He describes symptoms due to excess boron. He also briefly notes boron deficiency symptoms in other tree fruits and in carrots, table beets, spinach and cabbage. Further he deals

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with lime-induced chlorosis due to iron deficiency and its control, also manganese, copper and magnesium deficiencies and how they can be remedied. He notes that zinc deficiency symptoms such as little leaf have not as yet been seen in Canada.

86. KIDSON, E. B. 634.11-2.19: 631.83 + 631.811.6
An ash skeleton method for the diagnosis of magnesium and potassium deficiencies on apple leaves and for the determination of their distribution in the leaf.

N.Z. J. Sci. Tech., 1942, 24: 140B-5B.

A description of colorimetric tests for magnesium and potassium by means of Titan Yellow and sodium cobaltinitrate reagents respectively.

87. HÖFLER, K. 632.191
Über Kalkchlorose und Calciose im Jahre 1941 und W. S. Iijin biochemische Untersuchungen. (Lime chlorosis and calciosis in 1941 and W. S. Iijin's biochemical investigations.)

Phytopath. Z., 1942, 14: 192-203, bibl. 20.

W. S. Iijin's investigations on the biochemistry of lime-chlorosis (*Jb. wiss. Bot.*, 1942, 90: 464-529 and others, *H.A.*, 14: 558-9) are fully discussed and the name of "calciosis" is suggested for a disorder of non-lime-resistant plants on lime soils, of which actual chlorosis is only a particular form of visible manifestation.

88. ASKEW, H. O. 634.8-2.19: 631.83 + 546.27
A case of combined potassium and boron deficiencies in grapes.

N.Z. J. Sci. Tech., 1944, 26, Sec. A, pp. 146-52, bibl. 3.

Leaves and berries of the grape variety Albany Surprise grown in the Nelson District, New Zealand, showed symptoms of potash and boron deficiency respectively. The first signs of the disorder in the leaves were chlorotic mottling, which later led to scorching and collapse. While poor fruiting was also due to lack of potash, boron deficiency in the berries became manifest by the appearance of brownish-green areas under the skin. There was a good correlation between potash and boron content of the leaves and berries and symptom expression. Applications of sulphate of potash and borax (14-28 lb. per acre) remedied the trouble in the course of two seasons. The investigation was conducted by the Cawthron Institute.

89. KELSALL, A. 634.11-2.19: 546.27
The control of corky core.

Seventy-ninth A.R. Nova Scotia Fruit Growers' Ass. 1942, 1943, pp. 71-7.

For this boron deficiency disease of apples borax would appear to be the most suitable remedy in Nova Scotia. Effective control has been got by adding 2½ lb. borax per 100 gallon of spray mixture, used at calyx spray. The effects of this are, however, not so persistent as those following the application to the soil in early spring of 20-30lb. borax per acre. Such an application is effective for several years.

90. OSTERWALDER, A. 632.19: 634.11 + 634.23
Gelbe und rote Blätter an Apfel- bzw. Kirschbäumen im Juni und Juli. (Yellow and red leaves on apple and cherry trees in June and July.)

Schweiz. Z. Obst-u. Weinb., 1941, 50: 331-5.

Several theories on the premature appearance of autumn colours in cherry and apple leaves are discussed. With cherries, the phenomenon seems to be due to nutritional deficiencies indirectly caused by the shot hole fungus, as the healthy-coloured leaves of properly sprayed trees tend to prove. With apples, it is suggested that the unfavourable position of the oldest leaves on the shoots is the primary cause.

91. SINGH, U. B. 634.25-2.184
Control of sun-scald of peach trees in Kumau.

Ind. Fmg, 1944, 5: 73.

At the Government Fruit Research Station, Chauhattyia, United Provinces, sun-scald of peaches and other stone fruit trees was successfully controlled by tying straw all round the trunk as a shade treatment. Low heading induced by pruning was also found to give a certain amount of protection.

92. WALLACE, T., OGILVIE, L., AND SWARBRICK, T. 632.8: 634.13 + 634.11
Two virus diseases of tree fruits.

Gdnrs' Chron., 1944, 116: 140-1, bibl. 7.

Stony pit of pears, long known in America as a virus disease, has until recently not been recognized in England as such. Now at Long Ashton Research Station the disease has been transmitted by grafting. The fruit symptoms are described as follows: the fruits are curiously distorted, dimpled and deeply pitted with irregularly shaped pits, at the bases of which there are large masses of "stone cells". The pit bases are deep green, the more raised portions somewhat pale. Size is restricted and premature drop prevalent. When cut across, internal brown stony areas are visible. The pears become inedible. The virus has been found in Doyenné du Comice, Pitmaston Duchess, Durondeau, Beurré Bedford and Laxton's Superb. Bartlett (Williams) is a symptomless carrier. The Long Ashton experiments confirm those of J. R. Kienholz (*Stony pit*, a transmissible disease of pears. *Phytopathology*, 1939, 29: 260-7; *H.A.*, 9: 1220). Kienholz recently described another trouble in pears due to boron deficiency with which stony pit may be confused (Boron deficiency in pear trees. *Phytopathology*, 1943, 32: 1082-6; *H.A.*, 13: 420). The English symptoms, which did not yield to treatment by boron and iron by tree injection methods, are presumably of virus origin. *Apple mosaic*. A transmissible virus disease was reported in England in 1942 in Lord Lambourne apples. The condition was identical with the virus disease known in Canada and U.S.A. as apple mosaic or *Pyrus Virus 2* and described by H. E. Thomas (Apple mosaic. *Hilgardia*, 1937, 10: 581-8; *H.A.*, 9: 90). In Canada the disease is found in the English varieties Blenheim Orange, Ribston Pippin and Cox's Orange Pippin. In both diseases transmission appears to occur only through the use of infected scions. The object of the authors of the note is to call attention to the need of care in grafting the large quantities of new stock which will be required after the war. Other diseases of apples in America transmissible by grafting are noted but not described, namely, false stink and flat limb (Hockey, J. F. Mosaic, false stink and flat limb of apple. *Sci. Agric.*, 1943, 23: 633-46; *H.A.*, 13: 1261).

93. LI, LAI-YUNG, AND PROCTER, C. H. 634.37-2.8
A virus disease of fig in New Zealand.

N.Z. J. Sci. Tech., 1944, 26, Sec. A, pp. 88-90, bibl. 6.

A virus disease of the fig, *Ficus carica* L., is recorded from many localities in New Zealand. Symptoms of the disease resemble those of *Ficus Virus 1* Smith, 1937, and *Ficivirus caricae* Condit and Horne, 1941. Symptoms showed both on leaf and fruit, and the virus may be responsible for the premature dropping of figs. The virus has been successfully transmitted by grafting and budding. [Authors' summary.]

94. BUGOJAVLENSKI, A. A. 634.64-2.8
Some work on crop plants of Turkmenia during 1943. [Russian.]

Sovetsk. Botan., 1944, No. 3, pp. 46-7.

In addition to a short discussion about *Erysiphe communis* Grev on sugar beet, there is a description of what is believed to be a virus disease of the pomegranate (*Punica granatum*).

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95. SINGH, U. B. 634.1/8-2.4
Control of fruit diseases in Kumaun.
Ind. Fmg. 1943, 4: 411-2.
 The following fungoid fruit diseases, prevalent in Kumaun and causing considerable damage, are dealt with: stem-black and stem-brown of apples, caused by *Coniothecium chomato-porum* and *Botryosphaeria ribis* respectively, pink disease of apple, pear and apricot, caused by *Corticium Salmonicolor*, sooty-blotch and fly-speck of apples, caused by *Leptothyrium pomi*, soft rot of apples, a common storage disease caused by *Penicillium expansum*, and sun scald of stone fruit.

96. FITZPATRICK, R. E., MELLOR, F. C., AND WELSH, M. F. 634.11-2.411
Crown rot of apple trees in British Columbia—rootstock and scion resistance trials.
Sci. Agric., 1944, 24: 533-41, bibl. 2.
 The susceptibility of 40 different apple varieties and seedlings to the crown rot caused by *Phytophthora cactorum* in British Columbia was compared by artificially inoculating 1,560 trees. Eleven varieties proved highly susceptible, namely Beauty, Canada Baldwin, Duchess, Hyslop, Grimes Golden, Malling I, Olga, Winter St. Lawrence, Yellow Transparent, Wolf River and *Pyrus baccata*. Eleven, including Malling VI, were partially susceptible. Seven, including Malling I, were quite resistant. Eleven, including Malling IX, though apparently fairly resistant, were insufficiently tested. Depth of planting with the union 4 inches above, below and at ground level had no effect on the incidence of the disease.

97. HOCKEY, J. E., AND EIDT, C. C. 634.11-2.42
Resistance of apple seedlings to scab.
Sci. Agric., 1944, 24: 542-50.
 A record of the degree of susceptibility to *Venturia inaequalis* showed by the progeny of over 100 apple crosses at Kentville, Nova Scotia.

98. POWELL, H. R., AND CASS-SMITH, W. P. 634.11-2.42
The eradication of black spot or apple scab in Western Australia.
J. Dep. Agric. W. Aust., 1944, 21: 148-55.
 The story is told of how Western Australia achieved the eradication of apple scab within her boundaries after a severe outbreak of the disease in 1940. The following measures were adopted and generally enforced in order to prevent the spread of the fungus and the carry-over of the spores from one season to the other: (1) All infected leaves and fruits were stripped from the trees and destroyed. (2) All trees in the infected area and the ground beneath were sprayed with a 6: 6: 40 bordeaux mixture + spreader and a buffer area around the infected trees with a 3: 3: 50 mixture + spreader. (3) After picking, spraying with a 6: 50 mixture + spreader was repeated, no gifts or sales on the orchard being allowed without permission and then only to an approved destination. (4) A quick-growing cover crop was shallowly sown in early April throughout the orchard to prevent the leaves from blowing about after fall; in spring, at least a fortnight before bud burst the cover crop was deeply ploughed under, in one direction only; vines that could not be buried were destroyed by flame rows; subsequent cultivation, which was limited to dry light harrowing, was delayed until approved. (5) Spraying was carried out according to a schedule at spur start, pink blossom stage and petal fall. Measures (4) and (5) were yearly enforced until each infected orchard had remained visibly free of the disease for two full growing seasons. In 1944, twenty out of twenty-three originally infected orchards have remained free of any signs of apple scab for four seasons and the remaining three orchards have not shown any symptoms for three seasons. Rigorous regulations see to it that the disease is not reintroduced into Western Australia from an outside source.

99. ROLFS, F. M. 634.11-2.48
Apple blotch.
Bull. Okla. agric. Exp. Stat. B-261, 1942, pp. 15.
 The symptoms of the apple blotch disease caused by *Phyllosticta solitaria*, and its dissemination are described. In discussing the control of the fungus emphasis is laid on sanitary measures to be applied to seedling trees, nursery stock and young orchard trees, apart from eradication of all old forgotten trees on the farm

100. WORMALD, H. 634.22/3-1.541.11
A *Cylindrocladium* as the cause of a shoot wilt of varieties of plum and cherry used for rootstocks.
 Reprint from *Trans. Brit. mycol. Soc.*, 1944, 27, parts I and II, pp. 71-80, bibl. 6.
 Inoculation trials proved that the *Cylindrocladium* isolated from the underground parts of wilted plum, cherry, peach and apricot layer shoots and cuttings is the cause of shoot wilt. The fungus is morphologically identical with *C. scoparium*, but differs in its habits in culture from that species. Definite recommendations for control measures cannot yet be suggested, but it is recorded that spraying the layer rows, which had previously shown infection, with bordeaux mixture at the time of the two heavy earthings has given good results. Until further information is available growers are advised not to plant strawberries or raspberries on soil infested with this shoot wilt fungus.

101. WORMALD, H. 634.75-2.4
Strawberry leaf blotch fungus.
Gdnrs' Chron., 1944, 116: 160-1.
 The symptoms are described of the strawberry leaf blotch disease which has mostly been found on Royal Sovereign but has also been reported on Huxley's Giant. The causal organism is a fungus, whose imperfect (conidial) stage has been identified as *Zythia fragariae*, the perfect stage being a *Gnomonia*. Growers are asked to send diseased specimens to the author at East Malling Research Station.

102. BRIEN, R. M., AND ATKINSON, J. D. 632.47: 634.711
The occurrence of *Stereum purpureum* on the raspberry in New Zealand.
N.Z. J. Sci. Tech., 1942, 23: 346A-8A, bibl. 2.
 Silver leaf was found on raspberries in several areas in New Zealand in 1939, this being its first recorded appearance on raspberry in New Zealand. It was readily transmitted to previously healthy rooted suckers of Lloyd George.

103. HATTINGH, C. C. 632.752
The Argentine ant [*Iridomyrmex humilis*] in vineyards, orchards, packing sheds and houses.
Fmg S. Afr., 1943, 18: 467-71, bibl. 3.
 Methods of controlling the Argentine ant. The ant is largely responsible for the spread of mealy bug on fruit trees.

104. MÜHLOW, J. 634.13-2.753
En för Sverige ny bladlus på päronträdet. (An aphid on pears not previously recorded in Sweden.)
Växtskyddsnotiser, 1944, Nr. 4, pp. 60-1.
 The aphid *Yezabura pyri* has been recorded for the first time in Sweden in an orchard near Åkarp, where pear trees were alive with the pest, while interplanted apple trees remained clean. Spraying twice with nicotine, at concentrations of 0.1% and 0.3% killed all the aphids.

105. DICKER, G. H. L. 634.75-602.753: 632.96
***Tachyporus* (Col., *Staphylinidae*) larvae preying on aphides.**
Ent. mon. Mag., 1944, 80: 71.
 At East Malling Research Station and in the strawberry areas of England the larvae of the small beetle *Tachyporus obtusus* were found in considerable numbers preying on the strawberry aphid, *Capitophorus fragariae*. The aphid is so numerous that larvae could make little impression on it.

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106. FENTON, F. A. 634.11-2.76
 The flatheaded apple tree borer (*Chrysobothris femorata* (Olivier)).
Bull. Okla. agric Exp. Stat. B-259, 1942, pp. 31, bibl. 21.

A fair measure of control against borer was obtained by spiral tree wraps. To give most protection, these must be in place by early May and should remain on the tree for the first growing season or until about 1 October. The wrap should extend a few inches below ground level and extend beyond the point in the crown where the first branches originate. The bases of these should be wrapped also. The best paper to use is a medium heavy, specially treated, water-resistant material with a certain amount of resilience to allow for expansion due to increase in diameter of the trunk. Control given by painting with various substances was unsatisfactory and resulted in tree damage.

107. BARNES, H. F. 634.711-2.77
 Investigations on the raspberry cane midge, 1943-44.

J. roy. hort. Soc., 1944, 69: 370-5, bibl. 4.

Studying the biology of the raspberry cane midge, *Thomasianina theobaldi*, at Rothamsted, the author showed that the midges definitely preferred to lay their eggs where the skin of the raspberry cane was broken. A number of other observations, which throw light on the life history of the pest, are recorded. For the present the red bud borer, the hawthorn stem midge and the raspberry cane midge should be regarded as distinct from each other, but entomologists everywhere are asked to ascertain whether the red bud borer breeds indiscriminately on various fruit tree grafts.

108. LIEBERMANN, J. 632.729
 Los daños del grillotero en las huertas argentinas. (Depredaciones of mole crickets in Argentina gardens.)

Rev. B.A.P., 1944, 27: 57, 59-61.

An account is given of the life and habits of the mole cricket. The damage these pests do to garden crops is considerable and it often becomes essential to check them to save the crop. Various methods are mentioned, but poisoning is by far the most effective. There are many baits. That recommended here is made of bran 10 kg., Paris green 500 g., honey 2 litres, a few chopped and squeezed oranges and 14 litres of water. This is mixed into a paste from which the water can just not be expressed and is distributed in small heaps along the cultivated rows. It is poisonous to poultry.

109. BULL, L. B., AND MULES, M. W. 632.693.2
 An investigation of *Myxomatosis cuniculi* with special reference to the possible use of the disease to control rabbit populations in Australia.

J. Coun. sci. industr. Res. Aust., 1944, 17: 79-93.

Although considerable success has been achieved in the extermination of captive rabbits by virus control, results of the present trials show that the method cannot be used with any promise of success for the control of rabbit populations under most natural conditions in Australia. Only in small enclosures is the essential close contact maintained.

110. SYLVESTER, E. P., AND PORTER, R. H. 632.51 + 632.954
 Noxious and other bad weeds of Iowa.

Bull. Ia agric. Exp. Stat. P64, 1944, pp. 51-144, bibl. 8.

A description of injurious weeds grouped according to importance is followed by a detailed discussion of principles and methods of weed control.

111. SAXBY, S. H. 632.954
 Weed seedlings: control by weed burner.

N.Z. J. Agric., 1944, 69: 109-12.

A weed-burner is described which is designed to kill seedling weeds and has proved promising as a means of large-scale

weed control in vegetable production. It burns with a fierce "oil-less" flame and is used after the weed seeds have appeared and before the sown seed shows. The penetration of the heat through the soil being very small, the seed of the crop is not injured, though neither are the weed seeds which have not yet emerged. Under conditions when it is too wet to hoe, the weed-burner may prove profitable also for weed destruction between established plants. In a small-scale experiment good control was obtained with the burner mounted on a two-wheeled carrier with shield attached travelling at ground level between the flame and the row of plants. A number of other uses are anticipated.

112. WILLIAMS, W. 632.954: 546.27
 Control of buried viable weed seeds by means of boron.

Nature, 1944, 154: 771-2, bibl. 1.

In tests at the Welsh Plant Breeding Station, Aberystwyth, borax applied to the soil at the rate of 90 lb. per acre was found to have a very toxic effect on the germination of weed seeds in the soil. The soil samples were taken at a depth of 2-6 in. below the surface vegetation. The control boxes germinated a large population of buried viable weed seeds, the treated soil none at all. Thirty-five days after application of the borax, the soil was resown with clover. This plant had previously failed to germinate in the treated boxes, but germination was now even and vigorous with very few weed seedlings appearing, although the soil had been completely overturned at resowing. Should similar results be obtained in the field it is evident that distinct possibilities would arise of practical control for one of the most acute problems in agriculture.

113. COPISAROW, M. 631.8: 632.51
 Certain growth promoters and fertilizers. Part III. Calcium cyanamide and manganous sulphate in the reclamation of bracken-land.

J. Soc. chem. Ind. Lond., 1944, 63: 190-1, bibl. 22.

The following method proved very successful in the reclamation of bracken-land on one of the Vardre hillsides in North Wales. Late in autumn the bracken was cut and left on the ground and dressings of 10 lb. of calcium cyanamide and 4 oz. of manganous sulphate per rod were applied. In the following March a mixture of grass and legume seeds (4 oz. per rod) and soil, previously under pea cultivation (1 lb. per rod) was scattered on the slimy surface formed by the incorporation of the disintegrated bracken into the turf soil. The grass became established during the next summer. The plot being left unattended it reverted to its original condition in the course of 6 years as a result of a new bracken invasion from the plot boundary, but there seems to have been no revival of treated bracken on the plot itself. These observations suggest that bracken land could be permanently reclaimed if an area were treated as a whole. It is emphasized that different soil types and vegetations require different concentrations of calcium cyanamide and that the destructive powers of the chemical fall off rapidly with a reduction in concentration, while its nutritive properties become predominant. Thus in the case of heavy loam soil and hardy weeds complete humification may require 1 ton or more of calcium cyanamide per acre. If bracken land is to be reclaimed for arable purposes temporary leys are used as an intermediate stage. Bracken may be regarded as a soil-cleaning plant because of its effect on weeds and probably on fungi. This effect is increased by heavy dressings of calcium cyanamide.

114. THOMPSON, F. B. 632.51
 Chemical control of ragwort.

N.Z. J. Sci. Tech., 1942, 23: 337A-46A, bibl. 8.

Sodium chlorate destroyed ragwort better than sodium dichromate, ammonium thiocyanate or sodium bisulphite. The minimum, completely toxic dose was less than $2\frac{1}{2}$ g. chlorate per plant during the period October to March and more than 10 g. per plant during the winter. On plots with

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an infestation of 20 to 30 ragworts per square yard 37 lb. chlorate gave poor kills, 75 lb. good kills and 150 lb. slightly better kills. Applications to foliage were more effective than merely to the soil.

115. FRUIT-GROWER (EDITOR). 632.51

Fat hen and potash.

Fruitgrower, 1944, 98: 273.

The weed fat hen (*Chenopodium album*), according to letters from growers, is especially prevalent and luxurious on land which has been well supplied with potash or is naturally rich in this element. Dr. Brenchley of Rothamsted Research Station in "Weeds of farm land" is quoted as saying, "the plants [fat hen] possess a certain manurial value if they are ploughed in when green, as the potash content is about 10.9 per cent."

116. BORDEN, A. D. 632.95: 634.1/2

Speed sprayer saves labor in orchards.

Better Fruit, 1944, 39: 9-10.

The working of a new speed sprayer is described which it has not been possible, so far, to produce for other than experimental purposes. The spray cover is reported to have been very satisfactory, also in the case of old trees with dense foliage, although the dosage was about one-half that used by ground crews on the same sized trees. The saving in labour is considerable, since the tractor driver operates the entire equipment. It is estimated that the speed sprayer covers as much acreage as four fully equipped ground crews.

117. LÄUGER, P., MARTIN, H., AND MÜLLER, P. 632.951: 634.1/8

Über Konstitution und toxische Wirkung von natürlichen und neuen synthetischen insektentödenden Stoffen. (On the constitution and toxic effect of natural and new synthetic insecticidal materials.)

Helvetica chim. Acta, 1944, 27: 892-928.

This paper, which was read before the Society of Chemistry, Natural Science and Medicine, Basle, in January 1944, includes reference to insect pests of fruit trees.

118. DAINES, R. H. 634.25-2.951

Lime in the post-arsenical sprays as a means of reducing arsenical injury to peaches.

Phytopathology, 1944, 34: 763-4.

The inclusion of hydrated lime in post-arsenical sprays, approximately 2 weeks after the application of lead arsenate, materially reduced foliage injury to peaches at the New Jersey Agricultural Experiment Station.

119. DU PLESSIS, S. J. 634.8-2.952

Sulphur for the control of vine diseases.

Fmg S. Afr., 1943, 18: 472-3.

It is claimed that all known vine diseases, except bacterial blight, can be cured by the correct use of sulphur. The fungicide is also effective against erinose which is caused by eelworm. The paper gives instructions for treating the various diseases.

20. LAPAGE, G. 632.951

Applications of D.D.T.

Nature, 1944, 154: 600-1.

A summary, with a bibliography in the text, of the results obtained with D.D.T. as an insecticide against various pests chiefly those having a direct effect on human health. Its possibilities as a plant insecticide receive but brief mention.

21. MARTIN, H., AND WAIN, R. L. 632.951

D.D.T.; its properties and possible uses in horticultural pest control.

J. roy. hort. Soc., 1944, 69: 366-9, bibl. 4.

After briefly describing the properties and possible uses of D.D.T. in horticultural pest control the following limitations of this very promising new insecticide are noted: (1) It has no ovicidal effect and is therefore unlikely to become a

component of winter washes. (2) Its slowness of action may make it possible that the pests, for instance aphids, will reproduce in the interval between treatment and death, resulting in reinestation. (3) Except to the woodlouse, D.D.T. is not toxic to organisms outside the true insects.

122. CHAMBERS, V. H., HEY, G. L., AND SMITT, N. K. 632.951

D.D.T., a review.

Fruitgrower, 1944, 98: 178-9, 218, 221-2, bibl. 16.

An account of the new insecticide D.D.T. with special reference to its effects on insect pests of agriculture in Great Britain. The insecticide appears to act as a nerve poison killing by contact or after ingestion. Experiments now being carried out by the authors confirm the findings of others that D.D.T. is more efficient against codling moth than lead arsenate when compared on a weight for weight basis. Other experiments, some details of which are given, showed the value of the insecticide against red plum maggot (*Cydia funebrana*), raspberry beetle (*Byturus tomentosus*), strawberry blossom weevil (*Anthonomus rubi*), cockchafer (*Melolontha melolontha*), tomato moth (*Polia olereacea*), earwigs (*Forficula* sp.), woodlice and bugs. The results quoted are not always first-hand, being largely taken from Wiesmann's reports in *Schweiz. Z. Obst-u. Weinb.*, Vols. 51 to 53, 1942-44, H.A., Vols. 13 and 14 various. D.D.T. is ineffective against fruit tree red spider (*Oligonychus ulmi*) or greenhouse red spider (*Tetranychus telarius*).

123. RAZDORSKAYA, L. A. 632.951

The introduction of the insecticidal *Tephrosia* spp. to the U.S.S.R. [Russian.]

Sovetsk. Botan., 1941, No. 5-6, pp. 68-78.

The particular species described in this article was *Tephrosia vogelii*. It was grown at Picunda in Abkhazia. The plant is not particular as to soil; it can be propagated by seed; preliminary work suggests that it might be possible to propagate it also by stem cuttings. Transplantation of seedlings, if necessary, may be done during the cotyledon stage or when the first true leaves have been formed. The plants were grown in light soil with plenty of humus. The most suitable distances between them were found to be 70 x 70 cm. The plants grew high and shaded the ground underneath them sufficiently to render weeding unnecessary, and the dead leaves shed from the lower parts of the plants served as organic manure. When the whole plants were harvested, yields of 45 or more tons per hectare were obtained. Chemical analysis of the leaves, bark, stem and roots showed that the content of rotenone was as in the order given, highest in the leaves and lowest in the roots. As the season advanced, the content increased in the leaves and the bark, and decreased in the stem (without the bark). The content in the leaves reached a maximum between midday and 4 or 5 o'clock. In addition to *T. vogelii*, other species of the genus are briefly discussed, while other species of the *Papilionaceae* are also referred to as worthy of study. Besides being a source of rotenone, *T. vogelii* can be used as a green manure, for combating erosion, as a fodder and also as a medicinal plant.

124. SALYT, M. S. 632.951: 615.779.1

Wild daisies of the U.S.S.R. having a value as insecticides. [Russian.]

Sovetsk. Botan., 1941, No. 3, pp. 97-100.

Pyrethrum roseum and *P. carneum*, which are found growing wild in the Caucasus, often contain as much of the toxic principle as the *P. cinerariaefolium* usually cultivated. They have the further advantage of withstanding colder climates and drier conditions. *P. parthenifolium*, *P. balsamita*, *Chamaemelum kochii*, *Anthemis iberica* var. *tomentosa*, and *A. rigescens*, all coming from the Caucasus, likewise deserve study. Several other species, related to those mentioned above, are named which are of little value; but it is believed that a further study of the *Compositae* might lead to the discovery of useful toxic species.

125. BECKLEY, V. A., AND MCNAUGHTAN, F. 632.951: 615.779.1
Pyrethrum drying.
Rhod. agric. J., 1944, 41: 313-24.
A description illustrated by diagrams is given of the Ainabkoi Drier which has been designed like the east house type for pyrethrum drying in Rhodesia. The method of application is to enclose the rack of trays in a draught-proof box. Trays of flowers are moved successively downwards against the current of warm air. This drier is superior to locally employed devices in that it reduces the drying time of a tray to 8-15 hours without requiring excessive temperatures. Finally, the principles of a re-circulatory funnel drier are discussed, which has been in experimental use, but of which data are not yet available.

126. BROWN, J. G., AND BOYLE, A. M. 633.88: 632.96
Effect of penicillin on a plant pathogen.
Phytopathology, 1944, 34: 760-1, bibl. 4.
Petri-dish cultures showed *Erwinia carnegiana*, a pathogen of the giant cactus in Arizona and Mexico, to be susceptible to the bactericidal action of penicillin.

127. PEDERSON, C. S., AND FISHER, P. 635.34: 632.3: 632.952
The bactericidal action of cabbage and other vegetable juices.
Tech. Bull. N.Y. St. agric. Exp. Stat. 273, 1944, pp. 32, bibl. 31.
Cabbage juice was found to have a bactericidal effect upon gram-negative bacteria living on cabbage leaves and upon some pathogenic gram-positive bacteria. There is a varietal difference in the degree of bactericidal action, which equals in certain varieties that of onion juice. In contrast to onions, however, the bactericidal substance of cabbage juice is inactivated by heating.

128. BAKKE, A. L. 632.51
(12) Control and eradication of European bindweed.
Bull. Ia agric. Exp. Stat. P61, 1944, pp. 939-60.
BAKKE, A. L., AND OTHERS. 632.5
Relation of cultivation to depletion of root reserves in European bindweed at different soil horizons.
J. agric. Res., 1944, 69: 137-47, bibl. 9.

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129. NYHLÉN, Å. 635.1/7
Odlingsresultat från lokala försök med köksväxter under åren 1936-1937. (Some results of local vegetable trials in Sweden in the years 1936-37.) [English summary 4 pp.]
Reprinted from *Årskr. Alnarpss Lantbruks-Mejeri- Trädgårdsinstitut*, 1940, pp. 47, being *Meddel. Trädgårdsforsök* 10.
LAMM, R., AND NYHLÉN, Å. 635.1/7
Sammanfattning av sort- och stamförsök med köksväxter ur statens Trädgårdsforsöks Meddelanden av år 1940. (Summary of vegetable strain and variety trials from Government communications in 1940.)
ibidem, 1940, pp. 22, being *Meddel. Trädgårdsforsök* 11.
LAMM, R., LENANDER, S. E., AND HYLMÖ, B. 635.1/7
Sort-och stamförsök med köksväxter vid Alnarp 1937-1940. (Vegetable strain and variety trials at Alnarp 1937-40.) [English summary 1 p.] *ibidem*, 1941, pp. 80, being *Meddel. Trädgårdsforsök* 13.
LAMM, R., AND HYLMÖ, B. 635.1/7
Kort redogörelse för klassificerande sort- och stamförsök med köksväxter vid statens träd-

CARSNER, E. 632.8
The term *viruliferous*.
Phytopathology, 1944, 34: 765-6, bibl. 7.
Discussion but without a ruling.

CLANCY, D. W. 632.752: 632.96
Biology of *Allotropa burrelli*, a gregarious parasite of *Pseudococcus comstocki*.

J. agric. Res., 1944, 69: 159-67, bibl. 5.

CLAPPER, R. B. 581.111: 632.19
Improved cork-borer method for inoculating trees.
Phytopathology, 1944, 34: 161-2, bibl. 1.

HAYWARD, K. J. 632.7 (824.5)
Primera lista de insectos tucumanos perjudiciales: primer suplemento. (First supplement to the first [annotated] list of the injurious insects of Tucuman.) *Publ. misc. Estac. exp. agric. Tucumán* 4, 1944, pp. 32.
The first list published in 1942 noted *H.A.*, 14: 1184.

LOUW, A. J. 634.1/7-2.4
The control of fungus diseases in the [S. African] orchard.
Fmg S. Afr., 1943, 18: 450-4.

MARTEN, E. A., AND LEACH, J. G. 632.952
Some factors influencing the solubility of cuprous oxide in relation to its toxicity as a fungicide.
Phytopathology, 1944, 34: 459-70, bibl. 8.

NEL, R. I., AND STUBBINGS, W. A. K. 632.78
Coding-moth control [in S. Africa].
Fmg S. Afr., 1943, 18: 446-9.

NOBLE, N. S. 634.8-2.78-2.96
Euplectrus agaristae Craw., a parasite of the grape vine moth (*Phalaenoides glycine* Lew.). *Sci. Bull. Dep. Agric. N.S. Wales* 63, 1938, pp. 27, bibl. 33.

SUKHOV, K. S. 632.753
Salivary secretion of the aphis *Myzus persicae* Sulz. and its ability to form a filtering apparatus.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 226-8, bibl. 7.

WEST, T. F. 632.951: 615.779.1
The pyrethrins and the role of pyrethrum in anti-pest measures—Part I.
Chem. Industr., 1944, No. 33, pp. 290-4, bibl. 67.

gårdsförsök. Översikt för år 1941. (A review of vegetable strain and variety trials at Alnarp 1941.) [English summary 2 pp.]
ibidem, 1942, pp. 18, being *Meddel. Trädgårdsförsök* 15.

LAMM, R., AND HYLMÖ, B. 635.1/7
Kort redogörelse för klassificerande sort- och stamförsök med köksväxter år 1942. (Short report on results of vegetable strain and variety trials in 1942.) [English summary 1½ pp.]
ibidem, 1943, pp. 20, being *Meddel. Trädgårdsförsök* 16.

The vegetables, varieties of which are being tested in continuous trials at Alnarp, Sweden, include those ordinarily grown in England. When a variety or strain throughout 3 years' trials has satisfied high claims as to yield, earliness, quality, disease resistance and purity of type, it is designated by the Research Station as "first class". The reports cited above present the results of these trials and, in one instance, the results obtained at a number of substations in other parts of the country.

130. (KENYA DEPARTMENT OF AGRICULTURE) 635.1/7: 631.531
Report on vegetable seed production in Kenya during 1943, 1944, pp. 5, mimeographed.

Work on vegetable seed production initiated in August 1942

* See also 76 and 312.

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was continued at Njoro and Turi in 1943 and 1944 with the help of growers. Climatic conditions in 1943 were severe with deficient rainfall at Turi and results underlined the dependency of seed production on adequate water supplies at particular times. The conclusions based on the first year's investigations may be summarized as follows: Climatic conditions in E. Africa are not suitable for the economic production of seeds of certain kinds of temperate vegetables under conditions of international competition. The following, however, may already prove to be paying crops if advantage is taken of the lessons learned: certain varieties of carrot, cauliflower, cucurbits, lettuce, radish, New Zealand spinach and tomato. In addition there is already an established trade in peas and beans while seed potatoes are produced for E. African use. Vegetables which have so far given somewhat disappointing results are cabbage, celery, leeks, onions, turnips. It is felt, however, that some of the more difficult subjects could be acclimatized and in some cases crossed with indigenous vegetables. Work is urgently needed on early recognition and control of pests and diseases, use of fertilizers, pollination, sterility, root storage and seed storage.

131. HASKELL, G. 635.1/7: 631.531 + 581.162.3
The pollination and spatial isolation of vegetable seed crops.

Reprinted from *Northw. Nat.*, 1944, March and June, pp. 34-44, bibl. 18.

A compilation of data, from the literature, on the pollination and necessary spatial isolation of the following vegetable seed crops: Radish, cauliflower, cabbage and kales, rape, turnip and swede, broad beans, dwarf and runner beans, soya bean, carrot, parsley, parsnip, cucumber, marrow, lettuce, sunflower, tomato, beets, spinach, onion, leek, maize.

132. BECKER, K. E. 635.1/7: 631.531.17
Zur Beizung kleiner Mengen von Gemüse- und Gewürzsaaten. (The disinfection of small quantities of vegetable and spice seed.)

Forschungsdienst, 1944, 17: 267-9.

A method of disinfecting vegetable and spice seed with dusts is described which avoids the weighing of very small quantities of the chemicals. It consists in diluting the dust with talcum, covering the seed with the mixture and removing it by means of a sieve. A table shows the amount of residue on different seeds and the corresponding concentration of the pure chemical. The concentration, which may be applied without affecting germination, was determined for 18 vegetables and 4 different dusts.

133. GILES, W. F. 635.1/7(064)
The size of exhibition vegetables.
J. roy. hort. Soc., 1945, 70: 7-9.

Based on the pronouncement of a London chef who judged an R.H.S. exhibition in 1913, the principle is adopted that "to establish a standard of size, without reference to the use of the vegetable, would be absolute nonsense". A division of the classes into 3 sections is tentatively suggested: vegetables of a size (1) appreciated by the epicure, (2) by the average householder, (3) more suitable for large households, schools, institutions, etc.

134. BINKLEY, A. M. 635.1/7: 631.544
Starting vegetable plants in Colorado.

Bull. Colo. agric. Exp. Stat. 475, 1943, pp. 24.

The author gives instructions for making various kinds of hotbeds under glass for raising vegetable seedlings for subsequent open air cultivation. Except as regards electrical heating installations the advice does not differ from that to be found in gardening manuals, etc.

135. SANDERS, H. G. 631.582
Rotations.

Bull. Minist. Agric. Lond. 85, 1944, pp. 18, 4d.

This is essentially for the agriculturist. But of border line crops it may be of interest to the horticulturist to consider

how sugar beet, roots and potatoes fit into agriculture under different soil conditions.

136. (MINISTRY OF AGRICULTURE.) 632.765
Wireworms and food production. A wireworm survey of England and Wales 1939-1942, being a report from the Advisory Entomologists' Conference.
Bull. Minist. Agric. Lond. 128, 1944, pp. 62, bibl. 24, 1s.

An account of the technique of wireworm sampling used is followed by a discussion on the populations found, their influence on individual arable crops, including peas and beans and potatoes, and possible methods of control. The varying degrees of infestation are shown in a map.

137. WAGER, V. A. 635.1/7: 631.875
Straw mulch for summer vegetables.
Fmg. S. Afr., 1944, 19: 569-71.

Small-scale trials at the Botanical Station, Durban, indicated that a mulch of cut grass or other materials keeping the soil cool had a markedly beneficial effect on the development of vegetables in the coastal belt of Natal. The plants were covered with about 4 in. of grass cuttings when a few inches high. Photos clearly show the difference between treated and untreated rows of mealies, egg-plants and tomatoes.

138. LAMM, R. 631.544.3: 631.875
Orienterande försök med danogödsel. (Preliminary trials with "dano-fertilizer".) [English summary 2 pp.]
Reprinted from *Årsskr. Alnarps Lantbruks-Mejeri- Trädgårdssinstitut*, 1941, as *Meddel. Trädgårdsförsök* 14, pp. 15, bibl. 11.

Preliminary trials with "dano-fertilizer", prepared by a Danish method from town and house refuse, have shown that this compost is an excellent heat and carbon dioxide producing material for hotbeds, equal to straw-mixed stable manure. So far, yield results have been disappointing, but they are thought to be capable of improvement by means of plentiful watering and additional potash and phosphate application. In Denmark, it has been successfully used as a mulch in the greenhouse and for certain field crops, and it may prove valuable also for soil improvement.

139. GROVES, J. W., AND SKOLKO, A. J. 635.1/7: 631.4
Notes on seed-borne fungi. II. *Alternaria*.
Canad. J. Res., 1944, 22, Sec. C, pp. 217-34, bibl. 31.

Species of *Alternaria*, definitely pathogenic, have been isolated from various vegetable *Brassicaceae* and carrots.

140. ZERFOSS, E., AND STRAND, A. B. 631.544.3: 631.588.1
Electric light bulbs as a source of heat for hotbeds.
Bull. Tenn. agric. Exp. Stat. 190, 1944, pp. 13.

Three years of research at Tennessee University have shown that as a source of heat for hotbeds in the south-eastern area of the United States electric lamps are just as efficient as soil-heating cable, while investment and running cost are less. The description of the equipment, sixteen 25-watt Mazda B bulbs and a standard soil thermostat, and its installation is supported by photos and diagrams. Instructions are given for the operating procedure, and for proper ventilation and hardening of the plants before they are set in the field. Tabulated data indicate the most favourable mean weekly soil and air temperatures for the development of cool-weather vegetable crops. For cabbage and broccoli, for instance, the soil was preheated to 60° F. and after germination the mean soil temperature was lowered by 5-degree intervals to 45° F. in the course of 3 weeks.

141. VAN DER PLANK, J. E. 633.491-1.531
Suitability of a cool maritime climate for seed potato production.
Nature, 1944, 154: 644-5, bibl. 11.
A simple test has been devised in South Africa for determining the suitability of a coastal area for seed potato production. It was found that under maritime conditions an area can be relied upon to be free of the aphid *Myzus persicae*, if the mean maximum temperature during June (December in the southern hemisphere) is 65° F. or less, and if the daily range does not exceed 13° F. It is suggested that a survey on a large scale be made on the west coasts of Britain and Africa by releasing thermometers and Stevenson screens to farmers after the war.

142. MARRITT, J. W. 633.491-1.532.2
Treatment, packaging and storing potato eye sets.
Sci. Agric., 1944, 24: 526-32, bibl. 2.
Eye sets are becoming increasingly important in the distribution of potato planting material in Canada. The tubers, of course from certified seed stock, should be dipped in an organic mercury dip before the eyes are cut. The eye set is cut to at least $\frac{1}{2}$ in. in depth and $\frac{1}{2}$ oz. in weight and is at once washed in clean water. Dusting the eye sets with limestone or magnesium limestone, as sometimes advised, is less reliable. They are packed in a moisture-proof container, such as a wax-coated carton, wrapped with wax kraft paper and stored at 77° F. from 4 to 7 days and then at 38° F. until shipped. Continuous storage at 38° F. is also fairly successful, but not in the neighbourhood of 60° F.

143. SAVIĆ, V. M. 633.491: 612.014.44
The incubation of potatoes. [Russian.]
Sovetsk. Botan., 1943, No. 6, pp. 35-41.
Potato tubers of the variety Early Rose were put in boxes and from 1 March exposed to diffused light in a glasshouse; direct sunlight would have been too drying. Such illumination encouraged the initiation of chlorophyll development, but on account of the light and lack of moisture, vegetative growth was hindered. In 30 days short sprouts and the initial points of roots and stolons were in evidence. The tubers were then transferred to darker and moister conditions where, after another period of 30 days, the shoots became 3 to 4 cm. high. After yet another period of about 30 days miniature stolons were emitted on which tubers soon appeared, some of them attaining a diameter of 2 cm. By the end of June these miniature plants, which had passed through nearly all the preliminary stages of development and sometimes even reached the flowering stage but had not yet produced any but incipient roots, were ready to be planted out in the field where, within a space of about 40 days, they formed large, marketable tubers. This process of so-called "incubation" will, it is believed, enable potatoes to be grown as far north as latitude 67°30', where the period free from frost is only about 30 days, in regions of low rainfall, and in regions where the temperature should make it possible to obtain two crops of tubers in one season.

144. TER-SAAKIAN, T. S. 633.491-1.531
Two potato harvests from the same tubers.
C.R. Acad. Sci. U.R.S.S., 1943, 51: 33-5, bibl. 5.
It was shown that in the south of Russia parental tubers planted in summer and lifted in autumn may be used a second time for spring planting.

145. GARRUAZA, A. M. 631.436: 635.24+633.491
The influence of soil temperature on the development and yield of the potato, Jerusalem artichoke, and sugar beet. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 41-52.
Potato, Jerusalem artichoke and sugar-beet plants were grown in pots arranged in three series. Pots of the first series were painted black, those of the second white, and those of the third were covered with a special wrapping

which was always kept damp. A wide difference was thus maintained between the temperatures of the soil in the black pots and those in the damp pots. The general conclusion reached was that the coldest temperature inside the damp pots was more favourable to the formation of tubers and roots than the warmest temperature in the black pots. In the latter, the plants ran to leafage, spindly stems, narrower leaves, and less chlorophyll.

146. LEVINA, F. J. 676.2
The formation of swamps and the peat deposits of the Forgaria Valley. [Russian.]
J. Bot. U.R.S.S., 1944, 29: 192-9.
Among the plants which have appeared in the irrigation channels in some parts of the valley are species of *Cladophora*. Paper of good quality can be manufactured from the plants, the growth of which is very abundant.

147. KOLOSSOV, I. I. 633.63-2.112
Whitewashing of plants as a means of improving their water-regime and increasing the yield of sugar-beet.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 38-42, bibl. 2.
Spraying first-year sugar beet seven times during the summer and plants left to run to seed twice at the period of flowering with a 16% suspension of quick lime, to which 2% treacle was added, or with bordeaux mixture reduced transpiration by 14-23% and increased the yield of roots by 5-7.3% and the yield of seeds by 19-7%. Moreover, the quality of the seed was improved. The trials were conducted in the Kirghiz S.S.R.

148. KONOVALOV, I. N. 633.63: 581.144.4: 581.192
Scientific notes: the leaves from different positions on the plant, and the influence exerted by each on growth and on the accumulation of sugar in the root of the sugar beet. [Russian.]
Sovetsk. Botan., 1943, No. 6, pp. 42-6.
In the hope of utilizing beet leaves as a source of vitamin C, the author conducted experiments to find out which leaves—the inner or the outer—could be removed without reducing the yield of root or sugar content. It has already been pointed out by Kranke that the leaves of a plant which are formed early differ in many respects from those formed later. In these experiments it was found that the early stages of growth were slow, and removal of any leaves caused a reduction in the yield of roots. Only after 15 to 20 well-formed leaves had been developed was it possible to remove some of the outer leaves without diminishing the ultimate yield of roots or sugar. The removal of the inner leaves always caused diminution.

149. CURL, A. L., AND NELSON, E. K. 633.66
A water-soluble mannan from the seeds of *Daubentonia drummondii*.
J. Amer. chem. Soc., 1944, 1227, being *Contr. agric. chem. Res. Div. 138*.
It is believed that the seeds of this shrub of the pea family growing in the coastal plain from Florida to Texas, may become an important domestic source of mannose.

150. BUNJATJAN, G. H., AND JAROŠENKO, G. D. 633.689
Acorns as a source of starch. [Russian.]
Sovetsk. Botan., 1943, No. 5, pp. 50-7.
It has been estimated that one hectare can yield about 4 tons of acorns which, newly gathered and unhusked, contain 36% of nitrogen-free extractives, including sugars and starch, and between 2% and 4% of fat. For extraction, the acorns need neither drying nor hulling. They are ground as finely as possible and soaked in water, which is periodically decanted at intervals and renewed. The soaked meal is next put into canvas bags and kneaded in water. When all the starch has been thus extracted, the liquor containing it is left to settle in non-metallic containers and

the supernatant liquid (an emulsion containing fat, proteins, and tannin) poured off, more water being repeatedly added and decanted. All but the thin top layer of the settled precipitate is nearly pure starch, which is of good enough quality, after bleaching with SO_2 and drying, to be used for human food. Among the by-products of the starch extract are sugars and fat. The latter may be separated from the emulsion by means of HCl and SO_2 . It resembles sunflower oil in appearance and consistency but, owing to the presence of tannin, has a sharp and acid taste. It is, however, suitable for soap.

151. SARAPOV, N. I. 581.192
The formation of starch and sugars in plants. The effect of climate. Part II. [Russian.]
Sovetsk. Botan., 1941, Nos. 5-6, pp. 49-67.

The results of several investigations are cited to show that moisture is the dominant factor which, in adequate amount, ensures the maximal production of sugar in beet, starch in potato tubers, and both sugar and starch in Jerusalem artichokes and other horticultural crops. Neither temperature nor light exert such a decisive influence on the storage of sugars and starch as moisture. There is an optimum temperature above which the enlargement of roots and tubers is hindered; and if there is lack of moisture, enzyme action is so affected that starch and sugars are not synthesized in such large quantities as under more favourable conditions. Light, also, is rarely a limiting factor; in southern latitudes there can even be too much of it to ensure good yields of roots and tubers, and of the starch or sugars which they may contain. It is therefore pointed out that the natural conditions which favour the development of root and tuber crops are to be found in northern and north-temperate latitudes; but that in the south where, except in some highland regions, the heat and the strong light necessarily associated with it militate against maximal development of roots and tubers, an artificial supply of water can counteract the natural shortage of it and enable large yields of starch and sugar to be obtained.

152. BROWN, D. D. 633.71

Tobacco culture in Southern Rhodesia.
Rhod. Agric. J., 1944, 41: 362-71.

Detailed instructions on the preparation and care of tobacco seed-beds under the conditions of Southern Rhodesia.

153. ASKEW, H. O., AND BLICK, R. T. J. 633.71-1.56
Manufacturer's tobacco wastes: utilization in agriculture.

N.Z. J. Sci. Tech., 1944, 26, Sec. A, pp. 73-6.
 The utilization of tobacco wastes in New Zealand as fertilizers and as a source of nicotine was studied at the Cawthron Institute, Nelson. It is estimated that the material, data on the composition of which are presented, would yield fertilizers and conditioning agents in mixed fertilizers to the value of £2,500 annually, not counting the organic constituents, which have some additional value as soil improvers. The value of the extracted nicotine would amount to approximately £8,000. It is thought that the fertilizer freed from nicotine cannot act as a carrier of virus.

154. MOTHES, K., AND HIEKE, K. 633.71: 581.192
Die Tabakwurzel als Bildungsstätte des Nikotins.

(The formation of nicotine in the root of the tobacco plant.)
Naturwiss., 1943, 31, H.1/2, from abstract *Dtsch. Heilpfl.*, 1943, 9, Nr. 7, cover.

Tomato scions grafted on tobacco plants, which consisted only of the root and a short leafless piece of stem, were found to flower and fruit normally, but to contain nicotine in a concentration equal to that of tobacco shoots. The nicotine content of tobacco scions on tomato roots, on the other hand, was practically nil. When composed of three partners nicotine was present only in those plants that had a tobacco root as their base. The authors conclude that

nicotine is formed by the root and is transferred in the sap to the overground parts. This view is supported by the finding that the sap exuded by the root of a vigorously growing tobacco plant contains a high concentration of nicotine, which may be even higher than that of tobacco leaves. As nicotine had no visible effect on morphological or physiological processes in the tomato plant it is suggested that alkaloids have no function in plants. There are indications that the alkaloids of thorn apple and deadly nightshade are also formed in the root.

155. DAWSON, R. F. 635.64-1.541.11: 633.71
Accumulation of anabasine in reciprocal grafts of *Nicotiana glauca* and tomato.
Amer. J. Bot., 1944, 31: 351-5, bibl. 9.

The accumulation of anabasine and of nicotine in reciprocal grafts of *Nicotiana glauca* and tomato has been studied [at Princeton University, N.J.]. The alkaloids were isolated and identified as the crystalline dipicrates. Anabasine accumulated in appreciable amount in tomato scions grown on *N. glauca* roots and in *N. glauca* scions grown on tomato roots. Nicotine accumulated in small amounts in tomato scions grown on *N. glauca* roots, although this alkaloid could not be detected in intact plants of *N. glauca*. From these and other data recorded in the literature it is concluded that nicotine production is limited to the roots of *Nicotiana glauca*, as it is also localized in this organ in the case of *Nicotiana tabacum*. On the other hand, anabasine seems to be formed in both root and shoot of *N. glauca* independently. Finally, it is concluded that, potentially at least, the total anabasine content of the shoot of *N. glauca* may be derived in part from the accumulation of alkaloid translocated to the shoots from the roots. [Author's summary.]

156. SMIRNOVA, M. I., AND MOŠKOV, B. S. 581.192: 631.541
Grafting as a means of modifying the content of alkaloids in plants. [Russian.]
Sovetsk. Botan., 1941, Nos. 1-2, pp. 32-8.

Seeds from three kinds of lupin were sown for this experiment: (1) narrow-leaved bitter lupin containing 1.21% of alkaloids, (2) white bitter lupin containing 3.41% of alkaloids, and (3) narrow-leaved sweet lupin containing 0.019% of alkaloids. Two methods of grafting were employed: (1) the upper part of the embryo of the sprouted seed was grafted on the seedling of the stock plant; (2) the tip of a plant near the stage of bud initiation was grafted on the tip of another plant at a similar stage of development. The combinations "bitter on bitter" and "sweet on sweet" served as controls; and the other combinations were "bitter on sweet" and "sweet on bitter". It was found that the stock could cause the content of alkaloids in the leaves and seed of the scion to be increased or decreased according as it was itself of the bitter or sweet type. This effect was most pronounced when the second method of grafting was practised. The youngest leaves contained more alkaloids than the older, the content diminishing with age. Alkaloids were formed in the leaves and seed of peas when peas were grafted on bitter lupins.

157. RISCHKOV, V. L., VOVK, A. M., AND ALEXEEVA, T. S. 633.71-2.8
On the physiological peculiarities of the yellow strain of tobacco mosaic virus.

C.R. Acad. Sci. U.R.S.S., 1944, 42: 84-6, bibl. 3.
 A yellow strain of the *Nicotiana Virus 1*, isolated by the authors from tomatoes, was found to differ from the common green strain in that it was inactivated at 86° C. (as against 90° C.) and proved more susceptible to the oxidizing effect of hydrogen peroxide. Further, the yellow strain was found to accumulate at a lower rate and to inflict heavier damage on the host plant than that produced by the green strain. It is concluded that the yellow strain is not so well adapted to parasitism.

158. RABAK, F. 633.79: 581.192
 Report on hops.
J. Ass. off. agric. Chem. Wash., 1944, 27: 375-7.
 A report on the collaborative tests on the recommended method of determining the total soft and alpha resins in hops. Some changes in the procedure are suggested and the adoption by the Association of Official Agricultural Chemists of the revised method for the analysis of hops is recommended.

159. SATHER, J. D., AND HILL, D. D. 633.79: 581.192
 Some problems in measuring certain hop qualities.
Commun. Wallerstein Labs., 1944, 7: 87-100, bibl. 3, being *Tech. Pap. Ore. agric. Exp. Stat.* 442.
 Following the cutting off of European hop supplies the Oregon Agricultural Experiment Station established a hop analytical laboratory for developing hop grades and analysing the crop for seed, leaf and stem content. The paper presents the results of a study carried out in co-operation with the Brewers' Hop Research Institute and discusses sampling problems in some detail.

160. KUZNCOVA, A. P. 633.79-2.4
 A new disease of hops. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 108-12.
 A fungous disease, which was first observed on hops in 1937 and not hitherto mentioned in scientific literature, has been taken as a new species which the author has called *Plenodomus humuli* Kuznecova. Burning the old hop vines is one of the measures for preventing the spread of the disease. Bordeaux mixture and certain other chemical compounds in solution have been found effective when hop cuttings have been soaked in them.

161. MAGIE, R. O. 633.79-2.3/4 + 2.8 + 2.6/7
 Disease and insect control on hops.
Bull. N.Y. St. agric. Exp. Stat. 708, 1944, pp. 20.
 Based on experiments, which were conducted for 7 years in Oneida County, N.Y., a spray schedule for hops is presented for the control of downy mildew, powdery mildew, sooty mould, aphids and leafhoppers. For late varieties 4 applications (2 in June, 2 in July) of a 6-4-100 bordeaux mixture are recommended plus 4 or 5 lb. of wettable sulphur dust. In case of aphid infestation 1 pint of nicotine sulphate is added to the bordeaux-sulphur mixture. Sooty mould is controlled with 2 applications of nicotine sulphate. With early varieties spraying begins one week earlier and finishes about two weeks earlier than with late varieties, and the second nicotine sulphate application for sooty mould is not usually necessary. Under ordinary circumstances liquid sprays gave better results than dusts.

162. BAUER, K. H., RUDORF, W., AND HEEGER, E. F. 633.8
 Die Anbauverhältnisse einiger Heil- und Gewürzpflanzenarten unter besonderer Berücksichtigung der Wertstoffgehalte. (The growing conditions of some medicinal and spice plants with special reference to their content of valuable matter.)
Landw. Jb., 1942, 92: 1-52, bibl. 32.
 It was the object of this investigation to determine the effect of climate, soil and cultural measures on the yield of certain medicinal and spice plants. During 3 seasons two sowings were made at 9 different localities in Germany. *Coriandrum sativum*: The highest yields of coriander were obtained under conditions producing a growing period of 110-122 days, viz. in a cool and rather moist climate. Yields at Kiel amounted to 1,762 kg./ha. with an oil content of 0.91%. Mustard (*Sinapis alba*) prefers dry conditions. Yields of April sowings, resulting in a growing period of 100-115 days, were good. Oil and sinalbin content increased with the length of the growing period. Yields increased, under conditions of average rainfall, with the temperature sum. Preliminary results with caraway (*Carum carvi*) suggest that a moist and cool climate (Holland) is favourable for yields and oil content. Young valerian plants (*Valeriana officinalis*) collected in the Harz mountains responded to early planting, with sucker formation causing a reduction in yield. Content of ethereal oils and yields were highest under conditions of copious rainfall (650 mm. p.a.). To mature its seeds in central Germany marjoram (*Majorana hortensis*) requires a warm, not too moist, climate. Highest yields and highest content of ethereal oils, however, were obtained under rather moist and fairly cool conditions. The oil content of Mitcham peppermint (*Mentha piperita*) reached its peak (over 2%) in July and early August. High yields were related to a high oil content. Total yields were highest where the plants were cut twice, in one case 3 times. The oil content of the first leaf harvest was higher than that of the second. Too much rain proved unfavourable for yield and oil content, high air temperature (much sunshine) in conjunction with sufficient soil moisture increased the yields, while the oil content was slightly depressed. Experiments with irrigated plots gave interesting results.

163. BRANDÃO, J. S. 633.822
 A cultura da hortelã pimenta. (Cultivation of mint (*Mentha arvensis*) in S. Paulo, Brazil.)
Ceres, 1944, 5: 313-7.
 Routine methods of cultivation are described. The following suggestions for preventing rust may be of interest: (a) Replant yearly; (b) always use fresh ground; (c) bury the roots in furrows at least 5 cm. deep; this will help to keep the new planting free from spore contamination; (d) before planting plunge the roots in hot water, 45°C., for 10 minutes and plant immediately; (e) discard before transporting to the planting field all plants showing symptoms of rust; (f) in severe attacks put forward the harvest and cut the shoots at ground level; (g) in rusty plantations make the second cut before the advent of the cold weather to hinder the formation of winter spores; (h) after harvest bury deeply or burn all plant residues.

164. SEN, B., AND CHAKRAVARTI, S. C. 633.844: 581.143.26.03
 Vernalisation of mustard.
Curr. Sci., 1944, 13: 234-5, bibl. 3.
 A criticism of J. C. Sen Gupta's and N. K. Sen's paper (*ibidem*, 1944, 13: 160-1; *H.A.*, 14: 1713).

165. SCHMALFUSS, H., AND MÜLLER, H. P. 633.844: 633.85
 Über Senföle IV. Enthält Gelbseifen (*Sinapis alba* L.) flüchtiges Senföl? (On mustard oils IV. Does *Sinapis alba* contain volatile mustard oil?)
Forschungsdienst, 1944, 17: 271-2, bibl. 39.
Sinapis alba, probably of Dutch origin, was found to contain no volatile mustard oil.

166. HARDY, E. 634.5: 633.85
 British sources of nut oil.
Canning Ind., 1944, 20: 237: 31, bibl. 4.
 Among British grown plants from whose seeds useful oil can be extracted are hazelnut, beech, walnut, almond, peach, plum, cherry, grape, sunflower, fir, henbane, dyers' greenweed and tobacco. In this paper the specific gravity and saponification value of each are mentioned and brief comments are made on points of interest connected with each source.

167. MÜHLOW, J. 633.85-2.73
 Åkertripsen som skadedjur på oljeväxter.
 (*Thrips angusticeps* as a pest of oil crops.)
Växtsykdsnotiser, 1944, Nr. 4, pp. 58-9.
Thrips angusticeps is now the most widespread pest of oil crops in Sweden.

168. C.S.I.R., AUSTRALIA. 633.85
 Australian tea tree oils.
Bull. imp. Inst. Lond., 1944, 42: 161-4, bibl. 3.
 The distribution in Australia of the so-called tea trees *Melaleuca linariifolia*, *M. alternifolia* and *Leptospermum citratum* is briefly recorded. Data are given on the

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composition and commercial exploitation of the oils obtained from the leaves and terminal branchlets.

169. CARRICK, N. 633.861.9

Dyeing with managu.

E. Afr. agric. J., 1944, 10: 89.

Trials with berries of *Solanum nodiflorum* led to the production of a dye giving a strong and fadeless khaki colour. Although the berries, which are reminiscent of black currants, grow prolifically in certain East African areas, the dye does not seem to hold any promise for work on a large scale, as 16 oz. of berries are required for 1 oz. of wool.

170. TURECKAJA, R. H., AND MAKSIMOV, N. A. 633.879-1.535: 577.15.04

Scientific notes: the rooting of cuttings of *Salix caprea* L. [Russian.]

Sovetsk. Botan., 1943, No. 5, pp. 58-60.

The bark of *Salix caprea* may contain up to 20% of tanning substances, but the species is difficult to propagate; the seeds are small and soon lose their viability and cuttings usually fail to strike root. In the experiments described, heteroauxin from various sources, including maize and oats, was tried, and also the products of the tyrosine bacteria grown in agar-agar. Cuttings treated with heteroauxin in spring and summer failed to survive long. Those treated in September rooted successfully. Heteroauxin from maize meal did not stimulate root growth. The products of tyrosine bacteria promoted root growth to a limited degree.

171. JAKIMOV, P. A., AND OTHERS. 633.879

A new herbaceous tanning plant (*Polygonum sachalinense*, Schmidt). [Russian.]

Sovetsk. Botan., 1941, No. 4, pp. 55-65.

The use of tanning extracts enables even those plants containing a low concentration of tanning substances to be economically utilized. *P. sachalinense*, a perennial plant, was grown near Leningrad, having been propagated by means of rhizomes planted in spring. During the first year, while the root system was being established, the yield of leaves amounted to only 4 centners per ha., but by the fourth it had risen to 20 centners of air-dried leaves. The young leaves contained more tanning substance than the old, and during flowering, when it amounted to 6%, more than at any other stage of development. It occurs mostly in the mesophyll of the leaves, and also in the roots. From a yield of 20 centn. of air-dried leaves about 120 kg. of tanning substance may be obtained. It was found to be suitable for sole leather. The species withstands cold and is suitable for the northern and central regions of the R.S.F.S.R. It flowers in the autumn but cannot always be relied upon to form seed. It does not thrive in the shade. If grown in the drier regions of the south, it may suffer from drought, but it revives readily after rains have fallen in autumn. The tannines formed by this species are related to the pyrocatechin group, and have a slight admixture of pyrogallic tanning substances.

172. OVČINNIKOV, B. N. 633.879

A new tanning material—*Rumex thrysiflorus* Fingerh. [Russian.]

Sovetsk. Botan., 1941, No. 3, p. 101.

The roots of *Rumex thrysiflorus* contain between 5% and 20% of tanning substances, and have a degree of purity which varies between 28% and 51.37%. The content of tanning substances and their purity are both at the highest when the plant is in full flower and growing on a light sandy and slightly calcareous soil. Tanning with the extract gave excellent results. The plant is of common occurrence all over the U.S.S.R. and could also be easily cultivated. It has the additional advantage of having leaves which can be used as food, for they have been sold on the Leningrad market under the guise of the ordinary edible *Rumex*, from which they were indistinguishable in taste.

173. SAVIČ-LJUBICKAJA, L. I. 583.4: 633.88

The use of sphagnum (peat) moss in medicine. [Russian.]

Priroda [Nature], No. 4, 1943, pp. 41-50.

Sphagnum and peat have long been known to possess medicinal properties. In White Russia wounds were washed with the yellow water from peat bogs. Another use for sphagnum moss has been the stuffing of pillows and mattresses. Sphagnum moss began to be seriously investigated for surgical purposes in 1939, when the Botanical Institute collected many species of it and gave them to I. P. Vinogradov who examined their use in dressings, and tested also the sphagnum extracts, ointments, and powders which the Botanical Institute had prepared from the moss; but it was first discussed in Russian medical literature as early as 1885, and had been used during the Napoleonic and the Franco-Prussian wars. Vinogradov found that most of the species submitted to him possessed strongly absorptive properties; they included the following: *Sphagnum medium*, *S. recurvum*, *S. angustifolium*, *S. balticum*, *S. cuspidatum*, *S. fuscum*, *S. rubellum* (belonging to the *Acutifolia* group). All these species were found to be better than hygroscopic wool and sometimes even better than lignin. The use of the moss has been extended to many branches of surgery; and as it has also been found to exert a discouraging effect on the staphylococci and anaerobic bacteria, extracts of it have been prepared by a simple method described in the present article. In septic wounds sphagnum and its products have been successfully used, either sterilized or unsterilized, and have promoted healthy granulation.

174. KREIËR, G. K. 633.88

The ecology of *Artemisia cina* Berg. [Russian.]

J. Bot. U.R.S.S., 1944, 29: 136-42.

Several peculiarities of *Artemisia cina* have restricted its occurrence to a few areas in Kazakhstan; it cannot tolerate more than a low degree of salinity; it suffers after more than 24 hours in a waterlogged soil, yet it is also not to be found on elevated ground. It is well adapted to utilize every trace of moisture, and therefore grows best where the ground surface is either protected by a layer of dried-up plant remains, or in a friable condition. It is suggested that *A. cina* has arisen by natural hybridization between *A. serotina* and *A. validia*. Several other species of *Artemisia* are mentioned in the article. Among them are *A. maritima* var. *astrachanica* Kzkw., and *A. leucodes*, bearing camphor; *A. maritima* var. *salina* Keller, and *A. maritima* var. *calchanorum*, oil-bearing plants having an odour of lemons. *A. cina* is outstanding for the large amount of santonin, 5%, it contains. Recommendations are made for its cultivation.

175. REVERDATTO, V. V., AND GONCHAROV, A. G. 633.88

On the culture of some medicinal plants in the Novosibirsk province.

C.R. Acad. Sci. U.R.S.S., 1944, 43: 220-2.

The cultivation of *Lobelia inflata* and *Atropa belladonna* in Siberia is described.

176. PROCTER, C. H. 633.88-2.8

A virus disease of henbane (*Hyoscyamus niger* L.) in New Zealand.

N.Z. J. Sci. Tech., 1944, 26, Sec. A, pp. 83-7, bibl. 4.

Considerable losses of one-year-old henbane (*Hyoscyamus niger*) from a virus disease were experienced at Waihetau, New Zealand, where this medicinal plant, recently introduced into the Dominion, is being grown experimentally. Investigations into the nature of the virus showed that it is readily transmissible by leaf rubbing and by the peach aphid. The symptoms produced are similar to those of *Hyoscyamus Virus II* and *III* and, in certain hosts, to those of *Solanum Virus II*, but the New Zealand virus was found not to be identical with either of them. Longevity in vitro,

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dilution end-point and thermal death-point have been determined.

177. REVERDATTO, V. V. 633.88.115
New cardiac drug plants of the family *Cruiceiferae*.
C.R. Acad. Sci. U.R.S.S., 1943, 40: 251-2, bibl. 2.

Erysimum strictum, *E. linifolium*, *E. cheiranthoides* and *E. alticatum* were found to contain cardiac glucosides of a very high activity resembling that of *Strophantus*. The effect produced by cultivated *E. cheiranthoides* plants is reported to surpass that of wild plants. Equally active cardiac glucosides were shown to be present also in *Syrenia siliculosa*, which offers the advantage of very abundant flowering.

178. FUELLEMAN, R. F., AND BURLISON, W. L. 633.88.32.491
Castor beans. An industrial war crop.
Circ. Ill. Coll. Agric. Ext. Serv. 551, 1943, pp. 8.

Recommendations for the growing of castor beans, which trials showed to thrive in the southern half of Illinois. The results of variety tests are given.

179. ARNOLD, H. A., AND SHARP, M. A. 633.88.32.491-1.562
The improved castor-bean sheller. Description, operation and adjustment of the 24-inch sheller and separator.

Bull. Tenn. agric. Exp. Stat. 187, 1944, pp. 11.
Following the description in Bull. 179, of a new model of a castor-bean sheller details are given of an improved machine, adapted for commercial use. Diagrams, sectional views and photos explain the principles of construction.

180. COLORADO AGRICULTURAL EXPERIMENT STATION. 633.913
Plant-source possibilities for rubber production in Colorado.
Pr. Bull. Colo. agric. Exp. Stat. 96, 1942, pp. 15, bibl. 1.

A popular account of the principal rubber-bearing plants of Colorado. Little hope is held out that they will be of any value. Guayule (*Parthenium argentatum*) and kok saghyz (*Taraxacum kok saghyz*), which are not Colorado plants but may possibly be suitable for cultivation there, are also discussed.

181. SMITH, P. F. 633.913-1.55
Inhibition of growth in guayule as affected by topping and defoliation.
Amer. J. Bot., 1944, 31: 328-36, bibl. 15.

It has usually been assumed that the significance of cutting back woody transplants lies in the subsequent reduction in transpiration. The author's experiments, however, indicate that some inhibiting agent is involved in the strong retardation of growth occurring in untopped or undefoliated guayule plants after transplantation. The most remarkable finding was that a single adult leaf per branch was sufficient to inhibit new growth of stems and even of roots. Inhibitory effects, though in a less striking degree, were also exerted by terminal buds and bare stems from which the terminal buds and leaves had been removed. In the latter case the retardation was of short duration, probably as a result of the residual agent being inactivated or used up. Light was found to be necessary for the production of the leaf inhibitor, supposed to be auxin. Its characteristics are under further investigation. Most rapid recovery after transplanting and greatest uniformity in size of guayule nursery stock was achieved by cutting the plants back to three-quarters of their height, which operation generally removed all the leaves besides the terminal bud. The study was carried out at Salinas, Calif., under the Special Rubber Project of the Bureau of Plant Industry.

182. ADDICOTT, F. T. 633.913-2.19
On the effects of splash injury in guayule seedlings.

Phytopathology, 1944, 34: 508-10.
An examination of the cotyledons of guayule seedlings suffering from splash injury after irrigation showed that the trouble is non-pathogenic, being due to some mechanical cause. The brief investigation was carried out at the Guayule Research Project, Salinas, California.

183. HOYMAN, W. G. 633.913-2.654.1
Resistance of guayule to the root-knot nematode.
Phytopathology, 1944, 34: 766-7, bibl. 8.

Trials at the University of Arizona indicated that guayule is very resistant to root knot nematodes.

184. NICHIPOROVICH, A. A. 633.913: 577.12
Latex system in kok saghyz as a system for controlling water economy of the plant.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 190-3, bibl. 11.

Two experiments were devised to elucidate the function of the latex system in kok saghyz: (1) The roots of plants growing in well moistened pots were laid bare 4-5 cm. deep and incisions with a razor, which caused the latex to flow out but did not injure the wood, were made at intervals during 1-3 hours. The tabulated data show that transpiration is at first considerably reduced and returns to the normal rate 3-4 hours after tapping is over, when the equilibrium between the suction pressure of the lactiferous vessels and that of the leaves is likely to be restored. (2) The peduncles of plants from a well-watered plot at the stage of mass flowering were cut off directly under the heads, the operation being repeated several times about $\frac{1}{2}$ cm. below the last cut until the flow of latex ceased. It could be seen very soon that the treated plants lost their turgor and showed wilting symptoms. These results suggest that the lactiferous vessels act as a supplementary system for controlling the water economy of the plant. In support of this theory it is pointed out that the presence of such vessels is typical of many plants growing in regions with a sharply expressed periodicity and alternation of humid and dry periods.

185. PROKOFIEV, A. A. 633.913-1.8
On the possibility of rubber formation by plants on heterotrophic nutrition with carbohydrates.
C.R. Acad. Sci. U.R.S.S., 1944, 43: 170-3, bibl. 9.

By growing both entire tau saghyz plants and severed roots in the dark on synthetic media it could be shown that the synthesis and accumulation of rubber takes place in the latex system of the roots, independent of photosynthesis and even in the absence of above-ground parts. It is believed that this applies also to the other root rubber plants. As a result of preliminary trials Knop's solution with an addition of hexoses or saccharose as the heterotrophic carbohydrate source was used for sterile cultures in the dark, the pH value being 7-6 initially and 7-2-7.4 after a month. Particularly isolated roots thrived on asparagine, which in general proved equivalent to nitrates as a source of nitrogen. The addition to the culture medium, in insignificant amounts, of an extract from a *Penicillium* isolated from the seed was found to more than double the growth rate of isolated roots in a 7-day period and to increase the dry weight of whole plants grown in the dark to 31 mg. as compared with 20 mg. in the controls. The excretion of a live fungus separated from the severed root by a semi-permeable cellophane membrane proved even more beneficial.

186. MOLOTKOVSKY, G. H. 633.913-1.535.6
On the vegetative propagation of the rubber plants kok saghyz, tau saghyz and krym saghyz.
C.R. Acad. Sci. U.R.S.S., 1943, 40: 291-3, bibl. 2.

Studying the practicability of vegetative propagation in kok saghyz, tau saghyz and krym saghyz at the W. R. Williams Institute for Agricultural Research at Kazakhstan

the author found that cuttings of the root crown gave a good rooting response. Further experiments showed that in all three species the remaining roots after decapitation are not lost but regenerate a new leaf apparatus. Utilizing these results the following method was evolved. Decapitation was done with a garden knife and the root fragments, varying in length from 0.5 to 2.5 cm. with two-thirds of the leaves cut off, were planted vertically in June and in the case of kok saghyz in August. The cuttings of kok saghyz and krym saghyz were taken from 1-year-old plants and the rooting response was 65% and 88% respectively, while those from 2-year-old tau saghyz plants failed to produce any roots.

187. BOROVICK, S. A., BERGMANN, G. G., AND BOROVICK-ROMANOVA, T. F. 633.913-1.811.9
Data on trace elements contained in kok saghyz.
C.R. Acad. Sci. U.R.S.S., 1944, 40: 329-30.

The Pb, Sn, Cu, Zn, Co, Ni, Zr, Mo, Ga, Cr, V, Ba, Sr, Al, Mn, Ti and Si content of kok saghyz seeds, roots and leaves from Chistopol and Kazan was determined by spectrum analysis. The ash content of seeds, leaves and roots from plants of the same regions is also tabulated. The determinations were made at the W.I. Vernadsky Laboratory of Geochemical Problems.

188. PROKOFIEV, A. A. 577.15.04: 633.913
On the mechanism of the action of heteroauxin
[on rubber plants].
C.R. Acad. Sci. U.R.S.S., 1944, 42: 233-7, bibl. 5.

The fact that root cuttings of tau saghyz, kok saghyz and krym saghyz develop leaves readily but fail to produce roots might be due, it was thought, to the exhaustion of carbohydrates in the root segments by leaf formation. Suppression of the latter should therefore increase the sugar content and promote the formation of roots. That this view is correct was proved by treating 3 cm. long root cuttings, after preliminary wilting, with heteroauxin solution (0.1-0.5%; 3-20 hours), which gave the following results: (1) Root formation in tau saghyz was increased from 1.1% to 6.2-13.6% and in kok saghyz from 1.2% to 28.4%. Analogous results were recorded for cuttings of other plants. (2) At high concentrations of heteroauxin a considerable number of cuttings were killed. (3) From top to bottom of the root the capacity of cuttings to produce leaves decreases as that to produce roots increases. (4) In cuttings treated with 0.5% and 0.2% solutions leaf formation was reduced to nil as against 51.6% of cases in the controls and against 7.3% in cuttings treated with 0.1% solutions. (5) Treated cuttings contained large amounts of soluble sugars, whereas all sugar had disappeared in the controls. (6) Treatment with vitamins and other organic substances did not enhance root formation.

189. PONTOVICH, W. E. 633.913: 631.8
Development of tau saghyz seedlings as affected
by organic acids.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 360-4, bibl. 12.

Before deciding whether the very acid-susceptible tau saghyz seedlings were injured by the structure of the acids rather than by low acidity, the optimum pH value had to be determined. It was found to be 7.7, the roots browning and dying off with a pH < 6.0. Data obtained by testing the effect of adding potassium salts of 13 organic acids to the medium suggest that small-chain monobasic acids (e.g. propionic and valeric acid) suppress seedling development, whereas monobasic acids with the carbonyl group, especially the oxy-group (e.g. lactic or pyruvic acid) are favourable. Dibasic acids, especially succinic acid, were beneficial to seedling growth, but, as the number of oxy-groups and the dissociation constant increase, growth is depressed. This phenomenon may be connected with the relation between seedling development and alkalinization of the medium in the absence of glucose. Somewhat different results are obtained if ammonia salts are substituted for potassium salts. When

organic acids were present in a medium together with glucose, the weight of the seedlings was increased in most instances as compared with the controls.

190. RISCHKOV, V. L. 633.913-2.8
Kok saghyz yellows.
C.R. Acad. Sci. U.R.S.S., 1943, 41: 90-2, bibl. 2.

A disease of kok saghyz is reported as occurring on plantations in Bashkiria and its symptoms, antholysis of the inflorescence, chlorosis, stunted growth, etc., are described. Although it could not be proved by transmitting the infection, it is believed that a virus is the cause of the disease. A search undertaken by the author in the district showed that over wide areas the plants of certain *Compositae* exhibited severe symptoms of the yellows type of virus disease.

191. REMIŠEVSKÝ, A. S., AND JAROVENKO, B. F. 633.93 + 633.87
Raising some species of the *Anacardiaceae* at the
Botanical Garden of Kamenev-Podolsk. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 142-3.

The following is a list of species belonging to the *Anacardiaceae* with some notes of their properties: (1) *Toxicodendron vernicifera* (Stokes) Lincz. (*Rhus vernicifera* DC). Japanese lacquer is made from the sap. Grown in a dry sunny place. (2) *T. radicans* (L) Kritze (*Rhus toxicodendron* L.). A milky sap is exuded from wounds which soon turns black, and from this a black lacquer is made. The sap is very poisonous and produces a rash if it falls on the skin, or, during dry hot weather, even ulcers which take long to heal. The plant can be propagated by seeds and cuttings. (3) *T. vernix* (L) Kritze (*R. vernix* L.). A black lacquer is produced from the sap. (4) *Rhus coriaria* L. It is used in the preparation of thin leather. Black, brown, or red colours are yielded by the plant, according to the part used. (5) *R. aromatica* Ait. Raised from seed in 1936. Flowered vigorously in 1939. (6) *R. thyrifolia* L. Grown as an ornamental. The non-woody parts yield a milky sap. Bears fruit annually. (7) *R. silvestris* S. and Z. Raised from seed in 1936. No fruit produced. (8) *R. trilobata* Nutt. Raised from seed. After pruning it emits numerous shoots. (9) *Cotinus coggygria* Scop. (*R. cotinus* L.). A source of tanning material found in the leaves and in the bark of the young shoots. All the above species survived the severe winter of 1939 with little damage.

192. C.S.I.R., AUSTRALIA. 633.94
Xanthorrhoea resin.
Bull. imp. Inst. Lond., 1944, 42: 74-82, bibl. 16.

A description of the composition and the properties of the resin deposited in the leaf bases of 5 species of *Xanthorrhoea*, a member of the lily family, which is widely distributed throughout Australia. Methods of collecting and processing the material as well as the uses of the resin are also discussed.

193. KRÜGER, M. 634.987: 587.723
Die Rosskastanie und ihre Verwendung. (The
horse chestnut and its utilization).
Dtsch. Heilpfl., 1943, 9: 82-6.

The utilization of horse chestnut has been studied in Germany since 1937 and is now being carried out on a large scale. The most valuable product extracted is saponin, which is reported to equal that extracted from the bark of *Quillaja saponaria*. Although chestnut oil is claimed to be a table oil of good quality, similar to peanut oil, its exploitation does not seem economically feasible. The composition of the dry substance is given as 24-28% raw saponin; 8-10% raw protein; 5-7% oil; 2-3% raw fibre; 50-60% starch-containing residues.

194. AHLBERG, O. 635.13: 632.77
Olika morotsorter och morotflugan. (Carrot
varieties and the carrot fly).
Växtskyddsnotiser, 1944, Nr. 4, pp. 49-50.

In replicated trials at Alnarp the carrot fly showed a definite preference for certain carrot varieties, losses in the varieties

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Regulus, Guerande, London Market and Nantes averaging 53, 34, 25 and 19%, while those of Champion amounted to 10% and those of Amager and Amsterdam only to 3%. It cannot be expected that the less affected varieties would show a marked degree of resistance if grown by themselves, but it is suggested that as a supplementary control measure rows of especially susceptible varieties, which would serve as a bait, should be sown at intervals in carrot plots.

195. HEATH, O. V. S., AND MATHUR, P. B. 635.25: 612.014.44+581.036
Studies in the physiology of the onion plant. II. Inflorescence initiation and development, and other changes in the internal morphology of onion sets, as influenced by temperature and day length.
Ann. appl. Biol., 1944, 31: 173-86, bibl. 11.

The previously recorded effects on flowering of high and low temperatures are confirmed and further elucidated by data from dissections, which show the changes occurring at the growing point. Thus high temperature throughout the first season's growth from seed to set exerted an after-effect, completely preventing initiation of inflorescences the following spring.—High temperature for the first 8 of the 22 weeks' experimental storage period produced a similar after-effect in delaying and greatly reducing inflorescence initiation. High temperature throughout the 22 weeks not only completely prevented such initiation during treatment, but also practically inhibited it subsequently. High temperature during the growth from set to mature onion showed a direct effect in suppressing the emergence of inflorescences already initiated in the sets, apart from the effect of bulbing.—Inflorescences prevented from emerging, whether by high temperature or bulbing, were displaced by the axillary bud which carried on the further development of the plant. Low temperature for the first 8 weeks of storage exerted an after-effect in reducing the incidence of inflorescence initiation. When cold storage was given for the whole 22 weeks or the last 8 weeks only, initiation was prevented during treatment.—Sets produced at low temperature were prevented from forming leaf initials by continuous high-temperature storage and those produced at high temperature by continuous cold storage; this suggests some degree of acclimatization to low and high temperature respectively. It appears that the 1 to 2 leaf primordia formed at normal temperatures between mid-October and mid-March are initiated mainly during the latter part of that period. The number of swollen bulb scales in an onion set is nearly constant at 3, irrespective of set size. Even the unswollen leaf initials vary little in number over a considerable range of set size, and therefore the better yields given by large sets (if they do not bolt) must be due rather to large size of parts than to high number of leaf initials ready for emergence. The size effect on flowering is likewise not connected with number of leaf initials present in the sets; it may be a matter of the number of emerged leaves in the previous season. There appears to be a minimal total number (12-14) of leaves which must be initiated before an inflorescence can be formed. [The investigation was carried out at the Imperial College of Science and Technology, London. The effect of some of the treatments is illustrated by 4 photos of onion set sections.] [From authors' summary.]

196. GREEN, D. E. 632.8: 635.25/26
A suspected virus disease of shallots and onions.
J. roy. hort. Soc., 1945, 70: 24-9, bibl. 9.

Some preliminary data, collected at Wisley, are presented in respect of a virus disease of shallots and onions. The most marked symptoms are seen in shallots. The growth is stunted, the leaves are twisted, wrinkled and yellowish-green and the bulbs are reduced in size. The symptom expression becomes less severe, in decreasing order, with onion plants grown for seed, autumn-sown onions and spring-sown onions. Leeks also show the typical yellowish stripes down

the leaf blades. Observations indicate that the stripe disease is not transmitted in the seed or carried over in the soil, but the vigour of seed from severely affected plants was found to be largely reduced. The infection was seen to spread readily to an adjacent plot and to a plot 25 yards distant, whereas a plot 400 yards distant from the source of infection remained healthy. The deleterious effect of the virus on the quality of shallots is evident from the following figures: Average weights of shallots grown from healthy and diseased stocks were 9.8 and 6.0 g. respectively, their progeny weighing 57.0 and 17.5 g. respectively. Although the stripe disease need not be regarded as a serious menace to onion crops in Britain, certain control measures, such as roguing of shallots and planting seed crops at a safe distance from an infected plot, should not be neglected. Observations on the disease and its spread in other countries are also made.

197. BRIERLEY, P., AND SMITH, F. F. 635.25: 632.8
The perennial tree onion a carrier of onion-yellow-dwarf virus.
Phytopathology, 1944, 34: 506-7, bibl. 1.

A study conducted at Beltsville, Md., showed that the perennial tree onion (*Allium cepa* var. *viviparum*), being essentially a symptomless carrier, is capable of overwintering the onion-yellow-dwarf virus. The virus was found to overwinter also in the multiplier onion, which expressed, however, typical yellow-dwarf symptoms.

198. THOMPSON, E. G. 635.36: 631.521
Brussels sprouts trials, 1940-42.
J. nat. Inst. agric. Bot., 1944, 5: 45-59.

Data on yield, maturity, quality and size of sprouts of 14 brussels sprouts varieties tested at Cambridge for 3 seasons. Some outstanding features of 6 varieties are discussed and it is noted that there was apparently a varietal response to changes in soil fertility. To obtain maximum yields the sprouts should be picked at the stage when they have reached the peak of their growth and are in danger of losing their quality if left longer. This entails pickings at such short intervals as is economically feasible. For the production of smaller strains either the right varieties should be chosen or the distance between plants should be reduced. Spring-sown maincrop varieties were found to yield best if they were not picked until, at the earliest, mid-November.

199. SMITH, M. A. 635.41: 632.3
Bacterial soft rot of spinach.
Phytopathology, 1944, 34: 747-52, bibl. 5.

Bacterial soft rot, caused by *Erwinia carotovora*, is a serious spinach disease in Illinois, causing high losses during transit and on the market as a result of leaf decay. Inoculation experiments showed that uninjured leaves are also susceptible and that isolates of the bacterium from rotted spinach are pathogenic to potato tubers. High humidity and high temperature being favourable to the development of the disease, soft rot could be practically controlled in transportation and marketing by maintaining a temperature of 4-5° C. for 8 days.

200. PANGALO, K. I. 635.61: 582
A new genus of the Cucurbitaceae, *Praecitrullus*, an ancestor of the watermelon (*Citrullus* Forsk.). [Russian.]
J. Bot. U.R.S.S., 1944, 29: 200-4.

An examination of the anatomy and morphology of *Praecitrullus* leads to the conclusion that it is a relict of an ancient genus from which the genera, *Citrullus* and *Cucumis*, of the present day subsequently sprang. This theory runs contrary to the existing classification. The plant is described in detail, and the new name for it recommended by the author is *Praecitrullus fistulosus*.

201. MININA, E. G., AND MATZKEVICH, P. P. 635.63: 581.46: 635.63
Sexual development of plants as affected by different moisture conditions of the medium.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 309-12, bibl. 4.
 Experiments with cucumber plants showed that a rise of air humidity accelerated the appearance and increased the proportion of female flowers as compared with plants kept under dry conditions. The relative humidities were 89% at 23° C. and 50% at 30° C., the first female flowers appeared 8 and 14 days respectively after the first male flowers. The shifting of sex tendencies under the influence of high humidity is even more evident from the ratio of total male and female flowers, the figures being at different dates: 10: 1, 12: 1, 12: 1, 10: 1 (humid) as against 85: 1, 109: 1, 57: 1, 35: 1 (dry). Variations in soil moisture were found to have a similar effect.

202. ERMOLAEV, E. J. 635.63: 631.531
The effect of drying seeds on the growth and development of cucumbers. [Russian.]
Sovetsk. Botan., 1941, Nos. 1-2, pp. 86-9.
 The experiments lead to the conclusion that the yield of cucumbers can be increased if the seeds, after being dried, have not lost more than 40% or 50% of their moisture, and during drying are not exposed to a temperature of more than about 70° C. Such increase in yield as was obtained is attributed partly to the early emergence of the female flowers, which on the control plants was 9 days after that of the male flowers, but became progressively earlier as the temperature was increased, being simultaneous with that of the male flowers when the temperature was between 90° and 100° C. and even 2 days earlier when it was 110° C.

203. GILES, W. F. 635.64
Bush and tree tomatoes.
Fruitgrower, 1944, 98: 254.
 The bush or self-supporting tomato attracted considerable public attention 40 years ago and an upright variety known as de Laye, first raised at the Chateau de Laye, Villefranche, was catalogued by Sutton as early as 1862. The leaves of this variety were much curled and reticulated and blackish green in colour. The author now distinguishes 2 types of dwarf tomato, (1) those deriving from de Laye still characterized by the blackish green foliage, and (2) types with normal foliage but in which the terminal of the centre appears to go blind and induces the plant to throw out side growths in the form of a bush. This form is probably a mutation. Most bush tomatoes are late, but one from abroad, in a large series of trials conducted by the author, was, with the normal growing Earliest of All, the earliest to fruit of any tomato.

204. ROMSHE, F. A. 635.64: 631.544
Experiments with greenhouse tomatoes. Varieties, cultural methods, and relationship between yield and vegetative vigor.
Bull. Okla. agric. Exp. Stat. B-260, 1942, pp. 30.
 Favourable climatic conditions and other factors seem to warrant a considerable expansion of tomato production in Oklahoma, where the mild winter allows of a continuous growing season in the greenhouse. Tests of varieties and cultural methods showed that using the appropriate varieties, (1) the highest yields were obtained with plants trained to a single stem, and spaced 24×21 in., provided fertilizers were generously applied; (2) continuous production from the same plants throughout the forcing season is possible; (3) a fairly vigorous vegetative growth should be the aim, if good production is to be maintained over an extended period. There were no consistent relations between leaf area and yield or plant stem diameter and number of flowers, number of fruits and weight of fruit per cluster. Positive correlations were found between the number of blossoms on a cluster and the diameter of the stem several nodes below it, between stem diameter and number of fruit set per cluster and between fruit weight and the stem diameter above the cluster in autumn crops. A very close relationship was shown to exist between the fresh weight and the area of the leaf.

205. BATEMAN, A. J. 635.64: 581.192
Flavour in tomatoes.
Gdnrs' Chron., 1944, 116: 180.
 Replying to a correspondent a brief account is given of experiments on tomato flavour carried out at the John Innes Horticultural Institution. Tests showed that, while the tastes of individuals varied, tasters could be roughly divided into two classes: the "sweet-" and "sour-toothed". It was further found that the flesh of tomatoes is almost tasteless and that the sweetness or acidity of the fruit depends on variation in the pulp around the seed. In conclusion it is suggested that a selection for flavour ought to be based on a minimum of flesh combined with a highly flavoured pulp, which—in order to cater for both groups—should be either sweet or sweet and acid. The varieties Badsey's Potato Leaf and Harbinger are quoted as examples for "sweet" and "sweet and acid" respectively, while the bush variety Victor illustrates the type "nearly all flesh" and "very little flavour".

206. RADER, L. F., Jr., REYNOLDS, D. S., AND JACOB, K. D. 631.855: 635.64+635.65
Effect of picric acid in superphosphate on tomatoes and beans as indicated by greenhouse experiments.
J. Amer. Soc. Agron., 1944, 36: 544-51, bibl. 18.
 Superphosphate produced with spent sulphuric acid from the manufacture of picric acid, with a picric acid content of 0.85%, was found to have no adverse effect on tomatoes and snap beans, if used at rates to supply 250 and 500 lb. of total P_2O_5 per acre, corresponding to 10.8 and 21.6 lb. of picric acid per acre. Higher doses were injurious to tomatoes, whilst beans were somewhat more resistant to the toxic effect. In order to provide a wide margin of safety it is suggested that the manufacture of superphosphate should be adjusted so as to limit the picric acid content to 0.25%. The investigation was carried out by the Bureau of Plant Industry, Beltsville, Md. The experimental plants were grown in pots in the greenhouse.

207. FURKOVA, N. S. 631.811.91: 633.491+635.64
Growth reactions in plants under excessive watering.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 87-90, bibl. 5.
 The problem of lodging following excessive water supply was studied in tomatoes and potatoes by the Kazakhstan Branch of the Academy of Sciences of the U.S.S.R., *Solanaceae* giving the most pronounced response to flooding. In tomatoes the modifications produced by an excess of moisture in the soil are described as fundamentally identical with those produced by ethylene or other reducing agents. The weakening of the negative geotropic reaction was further found to be related to a decrease in the content of ascorbic acid and other reducing agents in the tissues. Poor aeration of the soil, which interferes with the normal redox processes in the plant, is believed to be the cause of deviations from the vertical growth habit.

208. WALLACE, J. M. 632.8: 633.71+635.64
Acquired immunity from curly top in tobacco and tomato.
J. agric. Res., 1944, 69: 187-214, bibl. 26.
 The following, among other, facts have been disclosed by tests of plant reactions to curly top virus. Regularly occurring recovery in tobacco; acquired resistance of recovered plants to injury from reinoculation; persistence in recovered plants of curly top virus not lessened in virulence; evidence of a time factor involved in the reactions leading to recovery; evidence that this recovery and acquired resistance do not result from invasion of embryonic tissues; proof of transfer by grafting of the acquired condition of tolerance and resistance from a covered plant,

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not only as an intraspecific transfer (tobacco to tobacco) but as an interspecific passage (tobacco to varieties of tomato that very rarely initiate the recovery reaction); and, finally, evidence of the striking specificity exhibited by different strains of the virus. This whole range of experimental evidence clearly indicates that the phenomena are immunologic in nature. [From author's summary.]

209. SCHUSSNIG, B. 635.64: 632.8

Eine neue Viruskrankheit der Tomatenpflanzen.
(A new virus disease of tomatoes.)

Forschungsdienst, 1943, 16: 62-84, bibl. 61.

A disease of tomato plants occurring in Moravia, the symptoms of which are reminiscent of, but not identical with, tip blight, was studied at the Horticultural Research Station at Eisgrub. The damage to the grower consists mainly in a deterioration of fruit quality resulting from loss of colour. It could be proved by means of inoculation experiments that a virus is the cause of the disease and it was further shown that thrips species act as vectors. Coloured plates help to illustrate the symptoms as they occur on fruits and the degeneration of the chloroplasts in leaf tissue.

210. VAUGHAN, E. K. 635.64: 632.314

Bacterial wilt of tomato caused by *Phytomonas solanacearum*.

Phytopathology, 1944, 34: 443-58, bibl. 14.

While experts agree that an outbreak of bacterial wilt of tomato in the northern states early in the season is due to *Phytomonas solanacearum* infection occurring in the south where the plants are raised, many points remain doubtful in respect of infections becoming manifest later in the season. The data presented in this article show that non-infected tomato plants and plants having incipient *P. solanacearum* infection cannot be distinguished before they have been grown in moist, warm soils. The conclusion reached, therefore, is that northern farmers can only guard against irreparable losses from setting infected plants by rejecting all seedlings from fields where an infection has been noted, no matter how localized the incidence has been. It was further shown that *P. solanacearum* can overwinter in the soil as far north as New Brunswick, N.J., and that the disease does not appear before the soil temperature has risen above 70° F. Prolonged drought may also delay the appearance of the disease. The most favourable soil reaction for the bacterium was found to be between pH 6 and pH 8, coinciding very nearly with the optimum conditions for the host. Since also in other respects the requirements of host and parasite agree, crop rotation is the only control measure left to northern farmers. Southern growers are advised to confine the raising of tomato seedlings to well-drained fields in which the disease has not been observed to occur.

211. LARSON, R. H. 632.314: 635.64 + 635.646

The ring rot bacterium in relation to tomato and eggplant.

J. agric. Res., 1944, 69: 309-25, bibl. 6.

Bacterial ring rot, caused by *Corynebacterium sepedonicum*, is the most serious of the potato diseases recently introduced into the United States. Anticipating that tomatoes will shortly be attacked by the bacterium, the response of these plants to *C. sepedonicum* infections was studied experimentally at the Wisconsin Agricultural Experiment Station. It was shown that the bacterium readily attacks tomatoes causing severe wilting and death. In the tissues of the tomato plant and fruit the ring rot organisms are restricted to the xylem, in contrast to the causal organism of tomato canker, *C. michiganense*, which lives in the phloem. The ring rot disease, to which all tested tomato varieties proved to be susceptible, is seed-borne. The only precautionary measure suggested is to avoid planting tomatoes on fields previously cropped to potatoes, which have shown even traces of ring rot in the previous season. All eggplant

varieties tested, with the exception of Puerto Rican Beauty and selection E-12, were also susceptible. These two resistant varieties are known to be resistant also to *Bacterium solanacearum*.

212. COLQUHOUN, T. T. 635.64: 632.314

Spary trial to control spotted wilt of tomatoes.
J. Aust. Inst. agric. Sci., 1942, 8: 171-2, bibl. 3.

At the Waite Agricultural Research Institute, Adelaide, spraying tomatoes with tartar emetic reduced spotted wilt incidence, but since 30% infection still obtained on the sprayed plots this can hardly be considered as efficient control. Further modified experiments are necessary to get a fuller picture of the situation, and the economics and commercial possibilities of the spray also require to be critically examined. Somewhat similar (unpublished) conclusions were reached by the Horticultural Branch of the Department of Agriculture, S. Australia, and pending further investigations no recommendations are made.

213. SMITH, P. G. 635.64: 632.314

Reaction of *Lycopersicon* spp. to spotted wilt.
Phytopathology, 1944, 34: 504-5, bibl. 2.

The susceptibility of a number of *Lycopersicon* species and *L. esculentum* strains to spotted wilt was tested at the University of California, Davis, in 2 years' trials. The results confirm the observations of two previous workers, who considered *L. pimpinellifolium* resistant under conditions of natural infection, with the exception of one susceptible strain found by the author. A high degree of resistance was shown by *L. peruvianum* and one of the two selections of the *L. esculentum* variety, German Sugar.

214. GLASSCOCK, H. J., and WARE, W. M.

635.64: 632.48

Alternaria solani on tomato.

Nature, 1944, 154: 642.

An outbreak of early blight in tomatoes, caused by the fungus *Alternaria solani*, has been recorded in Kent, where 1½ acres of an outdoor plantation assumed a withered or a scorched appearance. A detailed paper on the occurrence has been prepared.

215. ROBERTS, F. M. 635.64: 632.48

Factors influencing infection of the tomato by *Verticillium albo-atrum*. II.

Ann. appl. Biol., 1944, 31: 191-3, bibl. 6.

After having demonstrated in a previous investigation (*ibidem*, 1943, 30: 327-31; *H.A.*, 14: 788) that tomato plants are less susceptible to infection by *Verticillium albo-atrum* at low nitrogen levels, the present paper shows that resistance is increased also by reducing the leaf-shoot ratio. It may, therefore, be assumed that the protective effect of shading the plants is due to a reduction in photosynthesis rather than to a reduction in transpiration. Susceptibility was found not to be affected by different levels of potash applications.

216. LIST, G. M. 632.752: 633.491 + 635.64

Psyllid control on potatoes and tomatoes in the victory garden.

Bull. Colo. agric. Exp. Stat. 479, 1943, pp. 8.

The plants should be sprayed with wettable sulphur, 1 lb. to 10 gal. water at the rate of 125 gal. per acre, or dusted with dusting sulphur at the rate of 25 lb. per acre. The applications should be given every 10 days with tomatoes until fruit is well formed; 4 treatments will generally suffice. Potatoes are treated from the time they are 4-6 inches tall.

217. ROY, R. S. 635.646

A new variety of brinjal (*Solanum melongena* L.).
Curr. Sci., 1944, 13: 287-8, bibl. 1.

A mutant of the improved Sabour type I egg plant (better known as Mukhakeshi Collegia Baigun), was observed to occur in the Botanical Section, Bihar. The new strain S.T.2, which differs from the standard variety S.T.1 in its long, thin fruits, was thoroughly tested at Sabour Agricul-

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tural Research Institute and was found to outyield S.T.1 significantly.

218. WILSON, J. K. 631.463: 635.65
Over five hundred reasons for abandoning the cross-inoculation groups of the legumes.

Soil Sci., 1944, 58: 61-9, bibl. 11.

Over 500 cases were recorded at Cornell University where the boundaries around the 22 cross inoculation groups set up for the legumes overlapped, the nodule organisms being much less specific than was originally believed. These experimental results strongly support the view that there is no justification for maintaining cross-inoculation groups any longer.

219. KALMUS, H., AND KASSANIS, B. 635.65: 632.8: 633.71
Reduction by carbon dioxide of susceptibility of beans to tobacco necrosis viruses.

Nature, 1944, 154: 641-2, bibl. 2.

When bean plants, immediately before or after inoculation, were exposed to atmospheres containing 30-60% CO₂, their susceptibility to tobacco necrosis viruses was found to be greatly reduced as measured by the number of local lesions. It is thought that the increase in resistance is due to physiological changes within the cell. Plants, which were exposed to CO₂ atmospheres 4 hours before or after inoculation, showed no fall in susceptibility as compared with the control.

220. HEWITT, E. J. 635.65: 632.19: 546.711
Marsh spot in beans.

Nature, 1945, 155: 22-3, bibl. 7.

At Long Ashton Research Station, pea Duplex (*Pisum sativum*), broad bean Exhibition Longpod (*Vicia faba*), runner bean Scarlet Emperor (*Phaseolus multiflorus*) and French dwarf bean Masterpiece (*P. vulgaris*) were grown in manganese-deficient sand cultures, using a refined pot-culture technique, and the pods left on the plant to dry before harvesting. The seeds of all except the dwarf beans exhibited severe or mild marsh spot symptoms. The runner beans showed typical leaf symptoms (described), broad beans and peas only faint symptoms. In field trials in 1943 peas and broad beans growing in manganese-deficient soil showed various degrees of marsh spot. In 1944 the peas showed severe marsh spot and the beans only mild symptoms. Runner beans, dwarf beans, haricot bean Comtesse de Chambord and a tick bean showed no symptoms in the cotyledons, but later the dwarf and haricot beans showed typical severe symptoms in the leaves. The symptoms in these trials were cured and prevented by spraying the leaves with an aqueous solution of manganese sulphate (0.25%) solution of MnSO₄·4H₂O. The results show that peas are very susceptible to manganese deficiency, that broad and runner beans are more resistant and that dwarf and haricot beans—which show the most marked leaf symptoms—are most resistant and may remain free from marsh spot even when the leaf symptoms are very severe.

221. HOYMAN, W. G. 635.65: 632.4
Witches' broom of beans.

Phytopathology, 1944, 34: 505-6.

An abnormality of beans with symptoms identical to those of witches' broom is described and illustrated. The two cases observed occurred in two victory gardens at Tucson, Arizona, 4 string beans and 1 Lima bean plant being affected.

222. SLATENSEK, J. M., AND KIESSELBACH, T. A. 635.655
Edible soybeans in Nebraska.

Bull. Neb. agric. Exp. Stat. 356, 1944, pp. 10.

A number of edible soybean varieties are characterized and recommended and cultivation methods are described.

223. HUTTON, E. M. 635.656: 631.531.17
The field emergence and yield of garden peas as affected by treatments of the seed with fungicidal dust.

J. Coun. sci. industr. Res. Aust., 1944, 17: 71-4, bibl. 4.

Of the fungicidal dusts spergon, ceresan and cuprox, only spergon consistently and significantly increased the emergence of garden peas. The improvement was considerable with poor quality pea seed but small with good quality seed. None of the above treatments significantly increased yields.

224. FORSBERG, J. L., OLSON, E., AND BINKLEY, A. M. 635.656: 631.531.17
Experiments with pea seed treatments in Colorado.

Phytopathology, 1944, 34: 753-9, bibl. 13, being *Pap. Colo. agric. Exp. Stat. sci. J., Ser. 183*.

Pea seed treatments with a number of proprietary agents generally resulted in increased stands under Colorado conditions.

225. HUTTON, E. M. 635.656: 631.84
Experiments on the effect of nitrogenous manures on the yield of garden peas at Dickson, A.C.T.

J. Coun. sci. industr. Res. Aust., 1944, 17: 69-70, bibl. 2.

Under conditions at Dickson, which included the liming of the area some months earlier with 2 tons hydrated lime and the drilling in a week before sowing of 2 cwt. superphosphate per acre, as well as treatment with rhizobial culture prior to sowing, sulphate of ammonia applied at planting did not significantly increase the yield of green peas whereas the application of both it and nitrate of soda, 224 lb. and 288 lb. per acre respectively, at flowering time significantly increased yields by 15.1% and 12.6%.

226. LEBEDEVA, L. A. 635.8
An experiment in growing mushrooms at the Komarov Institute of Botany of the Academy of Sciences. [Russian.]

Sovetsk. Botan., 1941, No. 4, pp. 100-7.

The culture of *Agaricus arvensis* and two races of *A. campestris* was carried out in the basement of the Institute, where the beds were arranged in two tiers. The bottom bed lay on a layer of shavings in order that the concrete floor should not withdraw heat from the dung. The preparation of the beds is described. The spawn was planted in the middle of October. There is a description of Kljušnikova's method of raising sterilized spawn from spores. During the growth of the mushrooms, the temperature, ventilation and moisture were the main concern. The total yield of mushrooms from 68 square meters was 748.7 kg. The yield from the wild spawn of *A. campestris* was not appreciably lower than that from the artificially bred spawn of *A. arvensis*.

227. BLASBERG, C. H. 635.64
(16) Selecting tomato varieties for Vermont.

Pamphl. Vt agric. Exp. Stat. 10, 1944, pp. 7.
Late, intermediate and early varieties.

BREITWIESER, K. 633.8: 577.16

Vitamine in Drogen. (Vitamins in drugs.)

Disch. Heilpfl., 1942, 8: 129-32, 1943, 9: 3-8, bibl. 97.

GIDDINGS, N. J. 632.8: 633.63

Additional strains of the sugar-beet curly top virus. *J. agric. Res.*, 1944, 69: 149-57, bibl. 4.

JENSEN, J. H., AND LIVINGSTON, J. E.

635.65: 632.314

Variation in symptoms produced by isolates of *Phytomonas medicaginis* var. *phaseolicola*.

Phytopathology, 1944, 34: 471-80, bibl. 5, being *J. Ser. Paper Neb. agric. Exp. Stat.* 349.

On red kidney beans.

KLECKOWSKI, A. 632.8: 633.491 + 633.71
Combination of potato virus X and tobacco mosaic virus with pepsin and trypsin.
Biochem. J., 1944, 38: 160-7, bibl. 16.

LANGHAM, D. G. 633.85: 581.162.3
Natural and controlled pollination in sesame.
J. Hered., 1944, 35: 255-6, bibl. 1.

LAUFLER, M. A. 633.71-2.8
The size and shape of tobacco mosaic virus particles.
J. Amer. chem. Soc., 1944, 66: 1188-94, bibl. 31.

LAUFLER, M. A. 633.71-2.8
The influence of concentration upon the sedimentation rate of tobacco mosaic virus.
J. Amer. chem. Soc., 1944, 66: 1195-1201, bibl. 31.

MAKSIMOV, N. A., AND MOZHAEVA, L. V. 581.144.4: 635.1/7
Age variations of colloid-chemical properties of protoplasm in vegetable cells. I. Variations of permeability and viscosity of the protoplasm in the cells of onion scales and heads of cabbage.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 229-32, bibl. 10.
II. Variations in permeability and viscosity in the leaf cells of broad-beans and oats.
C.R. Acad. Sci. U.R.S.S., 1944, 42: 277-80, bibl. 7.

FLOWERS AND ORNAMENTALS.

228. HILLIER, E. L. 635.976
Four hundred of the most beautiful shrubs.
Published by E. L. Hillier, Winchester, England, 1944, pp. 10.
A list of the more beautiful shrubs that can be grown in the greater part of the British Isles. Very large families such as rhododendrons and azaleas are omitted, as also climbing plants, vines and conifers and dwarf shrubs specially suitable for rockeries.

229. INGRAM, C. 635.977.32
Notes on Japanese cherries. Part III.
J. roy. hort. Soc., 1945, 70: 10-8.
For parts I and II see *ibidem*, 1925, 50: 73-99 and 1929, 54: 159-180. The present paper presents the description of 5 additional varieties and of 4 further varieties where corrections in nomenclature had to be made. A key to the "cultivated" Japanese cherries is given as a supplement.

230. HOWARD, A. L. 586.23
The willow tree (*Salix* sp.).
Nature, 1944, 154: 835-7.
Following some general remarks on the significance of the willow in landscape and art seven British willow species and their utilization are described, namely, *Salix alba*, *S. alba coerula*, *S. caprea*, *S. pentandra*, *S. fragilis*, *S. vitellina* and *S. babylonica*.

231. PRAVDIN, L. F. 586.23: 631.535
The effect of date and pH of medium on cuttings of *Salix dasyclados* Wurum. [Russian.]
Sovetsk. Botan., 1944, No. 3, pp. 37-42.
Cuttings of *Salix dasyclados* growing out of doors were taken at monthly intervals from August to May, and put in phosphatic buffer solutions having various pH values. Every 15 days the number of roots and shoots were counted and their length measured. The results, which are tabulated, showed that root growth was most vigorous in cuttings taken in November and put in water or in solutions having a pH value of 4.5 to 6. Above pH 7 no roots appeared. On the other hand shoots, which began sprouting vigorously in December and continued with increasing vigour until May, showed the strongest growth at pH values above 6.

NICHIPOROVICH, A. A. 633.913: 581.49
On the integrity of the latex vessel system in kok saghyz and krym saghyz.
C.R. Acad. Sci. U.R.S.S., 1943, 40: 245-7, bibl. 3.

SALMON, E. S. 633.79
Four seedlings of the Canterbury Golding.
J. Inst. Brew., 1944, 50: 244-50.
See *H.A.*, 14: 1221.

SCHULTZ, E. S., BONDE, R., AND RALEIGH, W. P. 633.491-2.4
Early harvesting of healthy seed potatoes for the control of potato diseases in Maine.
Bull. Me agric. Exp. Stat. 427, 1944, pp. 19, bibl. 13.

SCOFIELD, C. S., WILCOX, L. V., AND BLAIR, S. Y. 633.854.54: 546.27
Boron absorption by sunflower seedlings.
Reprinted from *J. agric. Res.*, 1940, 61: 41-56, bibl. 14.

STATEN, H. W. 635.655
Edible soybeans for Oklahoma.
Circ. Okla. agric. Exp. Stat. C-107, 1943, pp. 8.
1942 variety tests. Notes on use and culture.

ZAUMAYER, W. J., AND HARTER, L. L. 635.65: 632.8
A severe necrosis caused by bean-mosaic virus 4 on beans.
Phytopathology, 1944, 34: 510-2, bibl. 2.

232. NEARING, G. G., AND CONNORS, C. H. 635.939.124: 631.535
Rhododendrons from cuttings.
Bull. N.J. agric. Exp. Stat. 666, 1939, pp. 23.
A method is described by which hybrid rhododendron varieties may be propagated from cuttings on a commercial scale by growing them in a specified, stratified root medium in a special type of frame under certain light conditions. The method proved equally successful with ericaceous and non-ericaceous, broadleaved evergreens and conifers. The most successful medium was prepared as follows: Bottom layer—3 bushels granulated peat moss, well rubbed, mixed thoroughly with 1 bushel weathered mushroom manure. Middle layer—½ bushel sedge peat mixed thoroughly with ½ bushel sand. Top layer—3 bushels sand. These quantities are for a box 2 ft. 10 in. wide by 5 ft. 10 in. long and 1 ft. deep at the lowest point.

233. MATJUK, I. S. 635.977
Celtis occidentalis L. [Russian.]
Sovetsk. Botan., No. 4, 1941, pp. 121-5.
On account of its rapid growth the tree is highly recommended for ornamental purposes, shelters, roadsides, embankments, and town streets. It can be propagated by seed planted without undue delay in sand or in the nursery where it will germinate in two years. The wood is heavy and hard.

234. BEKETOVSKI^{II}, D. N. 635.977
Some characteristics of the atypical form *Robinia pseudacacia* L. var. *monophylla* Kirschn. [Russian.]
J. Bot. U.R.S.S., 1944, 29: 29-35.
Evidence has been brought forward by Koržinskii and other investigators that atypical forms of *R. pseudacacia* L. are wanting in reproductive vigour, and are also in other respects handicapped in the struggle for survival. Although the author has himself confirmed the existence of such characters as seed failing to reach maturity, few seeds per pod and poor germination, yet he proves that in the case of *R. pseudacacia* L. var. *monophylla* Kirschn. these shortcomings are balanced by such characters as an ability to self-pollinate which the typical form lacks, an average number of florets per inflores-

cence about equal to that in the typical form and a proportion of seed set, resulting from self-pollination, which is larger. It is pointed out, in conclusion, that the emergence of atypical forms, with their unstable complement of inherited characters, is useful material for the plant breeder.

235. BOČANCEVA, Z. P. 635.976
An investigation into the biology of flowering and embryological development in *Haloxylon ammodendron* Bge. [Russian.]
J. Bot. U.R.S.S., 1944, 29: 36-48.

The buds of *Haloxylon ammodendron* are initiated at the end of summer but become visible only at the end of autumn. In early March buds situated on reproductive branches start into growth, forming 3 or 4 nodes by the end of March. The lower nodes bear flowers, the upper bear leaves. There are also entirely vegetative branches. There is copious flowering between 6 and 22 April near Tashkent, where these observations were made, and much pollen produced. As the first flowering period ends, vegetative growth predominates over reproductive development until about mid-August, when another flowering period ensues. The article contains a description of detailed microscopic examination of the male and female reproductive organs, and of the embryo.

236. KRUPENNIKOV, I. A. 635.976: 631.415.3
Resistance to salinity of *Nitraria schoberi* L. growing under natural conditions. [Russian.]

J. Bot. U.R.S.S., 1944, 29: 62-71.

Nitraria schoberi is a shrub found growing in the dry districts of Kazakhstan where the soils are very saline. Apart from the botanical study of the shrub in regard to the peculiarities which adapt it to saline conditions, to which the greater part of the article is devoted, it is mentioned that its fruits, in quantities amounting to about 1 kg. or more, somewhat resemble raisins in taste, though slightly salty, and are considered a delicacy by the inhabitants. It is recommended that, in saline areas, the shrubs be planted for their decorative value and as hedges. Furthermore, on account of the large quantities of salts which they are able to absorb, the salinity of the soil where they grow might in time be much reduced. The shrubs can stand as much as 8% of Cl, 13% of sulphates, and 9% of Na in the soil; and their dry matter may contain as much as 57% of salts.

237. ALGAZIN, U. S. 58.006(57): 635.9
The introduction of plants from the Altai. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 152-6.

This article contains a short description of plants collected in the Altai mountains and grown at Novosibirsk. The collection, mainly of ornamentals, includes shrubs, xerophytes, woodland plants and grasses from cliff habitats.

238. BERGSTRÖM-KIELLANDER, I. 635.939.98: 632.48
Undersökningar över viessnesjuka hos sommaraster *Callistephus chinensis* (L.) Nees. (Investigations into the wilt of China aster.) [English summary 12 pp.]
Meddel. Växtskyddsanstalt. 42, 1942, pp. 78, bibl. 52.

The causal organism of aster wilt, a serious and widespread disease, was found to be *Fusarium conglutinans* v. *callistephi*. Although soil disinfection experiments gave satisfactory results, control on a commercial scale is achieved more easily by growing resistant varieties.

239. GOLICYN, S. V., AND ZAMJATNIN, B. N. 635.9: 631.415.3
Pancratium maritimum on the Batum coast. [Russian.]
Sovetsk. Botan., 1941, Nos. 5-6, pp. 39-42.

There is a spit of sandy land in Adzaria, between a river and the sea, which is subject to salt-laden winds. The

vegetation includes large areas of *Pancratium maritimum* which offer a splendid sight when the plants are in full flower. The species is recommended for decorative purposes in the coastal regions of the Caucasus, both on the Black Sea and Caspian Sea.

240. HOLODNYI, N. G. 589.492: 581.192
The pollination of *Salvia glutinosa* L. [Russian.]
J. Bot. U.R.S.S., 1944, 29: 108-13.

The flowers of *Salvia glutinosa* provide for cross-pollination by bumble bees, which as they settle on a flower fan the pollen adhering to their bodies by the movement of their wings, causing it to be blown on the stigma which thus escapes possible damage as a result of coming in direct contact with the insect's body.

241. HAWKER, L. E. 635.944: 632.4
Diseases of the gladiolus. I. Control of hard rot, due to *Septoria gladioli* Passer., by fungicidal treatment of the corms.
Ann. appl. Biol., 1944, 31: 204-10, bibl. 12.
HAWKER, L. E., BRAY, R. J., AND BURROWS, T. W.
Diseases of the gladiolus. II. Experiments on dry rot disease caused by *Sclerotinia gladioli* Drayt.
Ann. appl. Biol., 1944, 31: 211-8, bibl. 8.

A number of mercury compounds were tested for the control of hard rot in gladiolus, the dehusked corms being treated before planting. Losses were reduced to a varying degree, but at the same time flowering was delayed, especially in the presence of a wetting agent. A 3-hour (possibly also a 1-hour) steep in a 0.1% solution of mercuric chloride combined maximum disease control with minimum delay in flowering. Treatment in November proved preferable to treatment in March. A second series of experiments was devoted to the dry rot disease of gladiolus. It was shown that resistance of young corms to infection by *Sclerotinia gladioli* increases as they develop, that unwounded corms are susceptible and that wet soil favours the disease. The susceptibility of corms planted in contaminated soil was increased, if the husks (leaf bases) were previously removed. There was no varietal difference in resistance. Of the treatments tested calomel was found to give the most consistent measure of control in corms of a diseased stock. Sterilization of infected soil gave good results, if not complete control, formalin being less effective than mercuric chloride, Aretan or Upsilonul. Both series of experiments were carried out at the Imperial College of Science and Technology, London.

242. BRIERLEY, P., AND SMITH, F. F. 635.944: 632.8
Study on lily virus diseases: the mottle group.
Phytopathology, 1944, 34: 718-46, bibl. 19.

Data are reported on physical properties, host range and vector relations of 3 lily-mottle viruses assigned to the tulip virus group of a latent type from *Lilium tigrinum*, of the strong mottle of Easter Lily and a more virulent mutant from the latter. A comparison with McWorther's Tulip viruses I and 2 indicates that the viruses under consideration should be regarded as strains or sub-species of the tulip-breaking virus. It is suggested that the species *Marmor tulipae* Holmes be amended to describe the latter.

243. WOOD, J. 635.944: 632.654.1
Hot water treatment of narcissus bulbs. Experiments on factors influencing the susceptibility of the bulbs to injury.
J. roy. hort. Soc., 1944, 69: 298-304.

The factors discussed are: the stage at which hot water treatment is given, time of lifting and storage conditions (temperature) before and after treatment.

244. TUNBLAD, B. 635.944: 632.654.2 635.9
Bekämpningsförsök mot lökkvalster. (The control of bulb mites.)
Växtskyddsnotiser, 1944, Nr. 4, pp. 53-8.

Bulb mites in the hyacinth varieties L'Innocence and Dr. Lieber were satisfactorily controlled, without injury to the bulbs, by any one of the following treatments: hot water, hot air, HCN, naphthalene, lime-sulphur and Upsulon. Disinfection with para-dichlorbenzene was found to prevent root formation and should therefore not be used. A further object of this study, which was carried out at Alnarp, was to determine whether mites had an adverse effect on the development of the host. The results indicate that healthy hyacinth plants are not affected by the presence of a few mites, but it could not be determined if or to what extent they facilitate fungal and bacterial infection. The most important sanitary measure, rated higher than bulb disinfection, is to unpack the bulbs immediately after their arrival and to let them dry thoroughly. This will check the reproduction of the mites and will at the same time lead to an early sorting out of damaged bulbs.

245. ARCYBAŠEV, D. D. 635.977
(4) Decorative gardening. (The latest achievements.) [Russian.]
O.G.I.Z., Moscow, pp. 346, 167. Illustr. in text.
Review in *Sovetsk. Botan.*, No. 3, 1944, p. 51.

KRASILNIKOV, P. K. 635.977
The rooting of branches of *Picea orientalis* observed in the Northern Caucasus. [Russian.]
Sovetsk. Botan., 1941, No. 4, pp. 126-7.

(CAMERON, A. E.) 589.124: 632.76
Report on the biology and control of the heather beetle [*Lochmaea satralis*].
British Field Sports Society, Petworth, Sussex, undated, 1s., from review *Nature*, 1944, 154: 839.

PIRONE, P. P. 635.937.34: 632.3/4
Diseases of roses.
Circ. N.J. agric. Exp. Stat. 405, 1941, pp. 11.

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246. (SUNDAYS RIVER RESEARCH STATION). 634.3
Research work in the Sundays River Valley.

Citrus Gr., 1944, No. 121, pp. 1-3.

An abridged report of recent research undertaken by the Sundays River Research Station. The station is maintained at Addo by the Sundays River Co-operative Company under the Direction of the University of Pretoria. *Project 1.*—Fertilizer trials with Valencia, begun 1936. Definite responses to nitrogenous fertilizers appeared in 1941 and were confirmed in 1943. Four different treatments (excluding the control) were tried. The highest yields, double those of the control, were obtained by 15 tons of kraal manure per acre (430 lb. per tree per annum), with a treatment consisting of 25 lb. per tree of dissolved guano B as close runner-up. The control trees receiving no manure rapidly deteriorated and had to be revived in 1942 and 1943 with sulphate of ammonia. In 1943, with irrigation normal, the fruit showed none of the puffiness that was in evidence in 1942 when water supplies were unavoidably cut off. *Project 2.*—Pruning and thinning of grapefruit. Pruning somewhat increased fruit size, and increased yield and improved health and vigour. There was little difference in yield between light annual pruning and heavy pruning in alternate years. Fruit thinning was in no way beneficial. *Project 3.*—Bud selection and stock/scion relations in grapefruit. It was found that, when buds were selected from trees showing pitting of the stem, the pitting was reproduced when budding was done on clean rough lemon stock in another district even at 18 months from bud. A virus is suspected. A re-inspection of registered budwood nurseries is urgent since the poor type of grapefruit tree now prevalent is proving very costly to the industry. Cecily grapefruit is less susceptible than Marsh and should be preferred in new plantings. *Project 4.*—Sulphur as soil amendment on brack soils. Sulphur applications lowered the pH of highly alkaline soils very appreciably but the response in citrus tree improvement was disappointing. *Project 5.*—Irrigation. Basin irrigation produced extensive foliage with a good crop in prospect on trees that under flood irrigation were extensively defoliated, profusely blossomed and chlorotic. In 48 hours basin irrigation penetrated to 4 ft. compared with 15 inches by flood. Comparisons with furrow irrigation are not yet available. *Project 6.*—Nitrogen nutrition. A definite drop in the nitrogen level of citrus leaves occurs with every growth cycle and particularly during flowering and fruit-setting. After December there is a gradual accumulation of N reserves until the next growth flush. Though there was much tree to tree variation trees receiving N bore heavier blossom and a heavier crop and lost almost twice as much nitrogen due to blossom and

fruit drop than the unmanured controls. The controls showed no N deficiency. It appears that 1 lb. of actual nitrogen is consumed by an 18-year-old citrus tree to mature a crop of 400-500 lb., without making allowance for nitrogen required for normal growth purposes, or for that lost by leaching, etc., which is difficult to estimate. Storage of this element is greatest from December to June in S. Africa and nitrogenous manures are best applied then.

247. LE ROUX, J. C., AND UNKLES, W. 634.3
Contour systems for orchards.
Citrus Gr., 1943, No. 119, pp. 2-5.

The layout of orchards on irregular slopes is discussed and illustrated.

248. SINGH, L., AND SINGH, S. 634.31-1.541.11
Citrus rootstock trials in the Punjab. II.* The influence of different rootstocks on the vigour of blood red orange.

Ind. J. agric. Sci., 1944, 14: 95-100, bibl. 4.

Conclusions are based on stem girth measurements of Blood Red (Malta) orange trees worked on rough lemon (*C. limonia*), sweet lime (*C. aurantifolia*), citron (*C. medica*), smooth lemon (*Citrus* sp.) and Kharna khatta (*C. karna*), after 5 years' growth in the orchard. The rough lemon and sweet lime stocks were seedlings, the smooth lemon, citron and kharna khatta seedlings and clonal. Where comparison was possible it is noted that the trees on cuttings remained noticeably bigger at the end of the five years than those on seedlings, though it is thought likely that later some of the seedling worked trees may grow more than catch up. Much the best growth was made on the rough lemon stocks: those on smooth lemon came next. Kharna khatta proved incompatible and citron also proved unsuitable. It is noted that kharna khatta is proving a useful rootstock for local Malta oranges.

249. CAMERON, S. H., AND HODGSON, R. W. 634.3-1.542
The crowded orchard problem. Preliminary pruning studies.

Calif. Citrogr., 1944, 29: 274-5.

Pruning seems to be the best way of dealing with over-crowded citrus plantations without prolonged reduction of crop, such as must occur if trees are cut out entirely, and certain degrees of severity are here compared. It was found that skeletonized Valencia orange trees recovered more quickly than those which were more drastically dehorned. Skeletonized (or A) trees had all growth less than $\frac{1}{2}$ in. in

* For Part I, see *ibidem*, 1942, 12: 381-99, *H.A.*, 12: 1462.

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diameter removed and the scaffold branches thinned out, the tree was thus left bare of foliage. Dehorned (or B) trees were left with 10 scaffold branches 3 to 4 ft. long; a more severe dehorning method (C) left only 5 scaffold branches 18 in. long. Skeletonized lemon trees soon become top heavy by reason of the luxuriant growth of new shoots. B or C methods would suit them better. Some practical observations are recorded. Large branches exposed by severe pruning should be shaded immediately or the bark will be severely sunburnt, causing dieback and decay. Pruning cuts should be painted with a protective material. The great numbers of new shoots which arise all along cut-back branches can be left unthinned for a year. Many will die out naturally and selection of the remaining shoots to form new scaffold branches will be little trouble. Newly selected scaffold branches need not be artificially supported unless few in number.

250. ANON. 631.67: 634.3

The measuring of water.

Citrus Gr., 1944, No. 127, pp. 4-5, 8.

This useful article describes the methods and provides the necessary tables for estimating the number of inches of irrigation water given or to be given to citrus plantations. It is essential that either a V notch gauge or a rectangular weir should be accurately installed.

251. (CITRUS EXCHANGE.) 634.31-2.95: 581.192
The reduction of acidity in seedling and late varieties of oranges.

Citrus Gr., 1944, No. 120, pp. 9-10.

In the 11th Annual Report of the Field Department of the Citrus Exchange (S. Africa) as a result of experiments over 3 years growers are recommended to use a lead-arsenate spray (2 lb. lead-arsenate per 100 gal. water) between December and February as a means of reducing acidity in seedling and late varieties of orange. There is a distinct carry over effect and fruit from trees sprayed 2 years in succession may become insipid. Spraying every third year is suggested. Yield, juice content and vitamin C content are not affected and the arsenic content of the mature fruit only negligibly so, while sprayed trees can be picked a fortnight earlier. Navel must not be given arsenate sprays.

252. J.M.H(ECTOR). 634.3-2.8

Conference on greening disease of citrus.

Citrus Gr., 1944, No. 120, pp. 3-5, 7.

A conference was held at the Pretoria H.Q. of the Division of Horticulture to discuss the greening of citrus fruit, a disease of marked importance, of which the cause is at present unknown. The disease may affect a large proportion or only a few of the fruits of the tree. The symptoms when clearly definable, which is not always the case, and never so with immature or over-ripe fruit, are a flattening of one side with an equal or a larger area remaining green in colour, the fruit having a lop-sided appearance, suggesting that growth in general over a considerable area has been checked. On the tree the more exposed areas of the fruit are invariably less affected than the less exposed areas and inside fruit shows a general arrest of development without malformation. The badly affected trees or portions of trees are usually stunted and badly mottled. Affected trees do not die off but remain stunted. Very extensive studies have been carried out without result. Soils where greening is severe have been found to be acid, but pot experiments indicate that this condition cannot be a deciding factor. No correlation could be obtained with deficiency or excess of minor elements, or nematode infestation, with fungus attack or with virus. The author considers that the greening condition is either due to a virus or, alternatively, that local soil conditions inhibit the absorption of one or more soil solutes. The inhibition may be indirect, affecting in the first instance the symbiotic relationship between the roots and their fungus flora.

253. FAWCETT, H. S., AND WALLACE, J. M. 634.3-2.8
Wood discoloration in psorosis delayed by treatment.

Calif. Citrogr., 1944, 29: 364-5.

Internal wood discoloration often follows the exterior bark lesions in psorosis A (scaly bark). The wood discoloration is usually accompanied by retarded growth and progressive deterioration of branches and foliage. These ill-effects are caused by the stoppage of water through a plugging of vessels accompanying the discoloration. If the bark lesions are promptly treated before they have been long on the trees, the wood discoloration with its consequences may be prevented for many years.

254. BERTELLI, J. C., AND DE BERTELLI, L. K.

634.3-2.4

Podredumbre de las raízillas de los citros.
(Root rot of citrus.) [English summary ½ p.]

Rev. Asoc. Ing. agron. Montevideo, 1944, 16: 3: 26-43, bibl. 19.

A study in Uruguay of the disease known as citrus root-rot, which first appeared in Argentina 14 years ago and is now in Uruguay, having been introduced apparently by imported buds, grafted on to local sour orange. No traces of anatomical, histological or physiological incompatibility could be found in affected trees. Since the disease appears in all manner of soil types, the absence of some minor nutritional element is improbable as a cause. A careful study was made of the effect of the root nematode *Tylenchus semipenetrans*. The symptomatology of nematode attack as shown by the trees is easily confused with that of root-rot. It seems, however, that whereas nematode-infested trees will recover after heavy organic manuring and remain cured, those attacked by root-rot merely make a spasmodic recovery before sinking back into their former condition. In many diseased plants the authors noted what they call a depressed girdle appearing on the stock just below the union, the bark appearing darker than the rest. [In the rather poor photographs provided the girdle has the appearance of the beginnings of an overgrowth of the scion.—ED.] Five of these stocks were examined in the laboratory. No anatomical or other signs of incompatibility could be found, but in sections examined microscopically an abundant mycelium with some gum plugging was found in the conducting tissues of the xylem and vessels of 4 out of the 5 stocks. From this wood a fungus was isolated, apparently a *Lasiodiplodia*—or *Botryodiplodia*. These fungi are known to gain entrance through wounds, especially on trees already debilitated, and will gradually kill them. Their effect on citrus is being investigated and the possibility that a virus is involved will also be studied.

255. NEILL, J. C.

634.3-2.4

Rhizophagus in citrus.

N.Z. J. Sci. Tech., 1944, 25, Sec A, pp. 191-201, bibl. 35.

The effect on citrus of the soil fungus *Rhizophagus*, which inhabits roots of practically all plant species was examined by the Plant Diseases Division, Department of Scientific and Industrial Research, New Zealand. The experimental results indicate that the phenomenon apparently neither constitutes a case of parasitism nor one of beneficial mycorrhiza. But even if the endophytic hyphae should have proved harmful no remedy could have been suggested in view of the susceptibility of citrus roots to the *Rhizophagus* strains generally present in Auckland soils. Briefly discussing the biology of the fungus, in which no form of fructification has ever been reliably reported, it is suggested that the universally present *Rhizophagus* can be conceived as one individual that, co-existing with the earliest plants, has spread with them and has achieved a state of physiological balance with them.

256. KLOTZ, L. J., AND FAWCETT, H. S. 634.3-2.19
Progress report on "decline" of citrus.

Calif. Citrogr., 1944, 29: 294-5.

The lines on which the investigation on the "decline" of

citrus in California is proceeding are briefly stated. The work includes study of soil moisture relations, identification and isolation of micro-organisms associated with the injured roots of declining trees, the production of nitrous nitrogen or nitrite in the soil, etc. Orders of resistance for varieties of citrus seedling roots and trunk bark of citrus stocks to *Phytophthora* brown rot fungi have been established. It was found with seedlings of many citrus varieties that small concentrations in the soil of nitrous nitrogen or nitrites lessen the ability of the roots to absorb water even without visible injury.

257. KLOTZ, L. J. 634.3-2.411
Protection against brown rot and gummosis.

Calif. Citrogr., 1944, 29: 366-7.

Citrus trees can be protected as regards their fruit from brown rot by spraying the lower foliage of the tree, up to a 3-ft. level with a 3-3-100 bordeaux mixture. If cyanide fumigation is to follow, the concentration should be 1-1-100. A sticker is not required unless the 5-1-4-100 zinc-copper-hydrated lime spray is used. The addition of zinc sulphate reduces fumigation injuries. In the packing house brown rot may be prevented by the immersion of the fruit for 2 to 4 minutes in hot water or treating solution at 115° to 120° F. In such cases it is usual to precondition the fruit by permitting a slight preliminary wilting in order to prevent the liberation of rind oil and subsequent spotting. Gummosis of crown and trunk must be eliminated by surgery, or it will girdle and kill the tree. There has recently been a severe outbreak in Southern California among old established trees which was not noticed till many were beyond help. Treatment consists in the removal of the diseased bark and the presence of the disease is revealed by the sooty layers which appear when the outer bark is lightly scraped. After removal of diseased bark (the cambium must not be scraped) the exposed area is dusted with spray-dried bordeaux or spray-dried zinc-copper-lime or tetrachloroquinone, or is painted with 1% permanganate of potash solution or suspensions of the consistency of house paint of one of the three dust materials mentioned. After a week in which to dry, the treated lesion is painted with tree seal or white lead paint.

258. WOGLUM, R. S. 634.3-2.6/7
Citrus pest problems in review.

Calif. Citrogr., 1944, 29: 340, 360-1.

A review of the citrus pest problems of California by the entomologist of the California Fruitgrowers Exchange. Discussing the place of DDT in citrus pest control the author points out that as regards agriculture DDT has never been tried on a field scale. The results have all been obtained in the laboratory. It is therefore impossible to say how great an influence on pest control this new substance will have when it becomes available to agriculture in bulk.

259. COIT, J. E. 634.3-1.462
Starting replants in old citrus orchards.

Calif. Citrogr., 1944, 29: 307.

Replants in established citrus orchards in California may suffer root injury from eelworm (*Tylenchulus semipenetrans*), from the rose weevil (*Pantamorus godmani*) which injures roots as a grub and foliage as an adult, and from waterlogged soil due to the collection of irrigation water on the empty site with no large tree present to use it, a condition which favours the growth of root rot fungi. A fourth deterrent to active growth at the start is root competition from older trees. All these can be dealt with by the sterilizing of the plant site by the injection, 12 inches deep, of a charge of 1½ oz. carbon bisulphide, the injections to be spaced 18 inches apart in a circle 6 feet in diameter with 5 injections distributed about a foot from the centre of the circle where the new tree is to stand, the injections to be made a week before planting. Prevention of root competition is effected by the carbon disulphide killing back the feeding root tips of the established trees which may have

penetrated into the planting site. Other obstacles to growth not to be countered by soil sterilization are the omission when irrigating to ensure that the water reaches the young trees from the furrows, or, should water reach the trees, the failure to turn it away after the ball of the transplant has been thoroughly wetted, thus allowing the surrounding empty soil to get waterlogged.

260. ANON.

Boom sprayers in citrus orchards.

Calif. Citrogr., 1944, 29: 276.

634.3-2.95

An illustrated description of types of the oscillating spray booms at present under development in Californian citrus orchards. The use of these appliances greatly reduces labour and cost while, except for the densest trees, their efficiency is better than that of the type of labour at present available. One such comprises a 500 gallon tank with a 35 h.p. motor and a pump capacity of 60 gallons per minute at 600 lb. pressure. Six Hardie 202 guns with No. 6 discs are supplied from a 10½ ft. vertical stationary boom. The bottom gun is stationary while the other guns are attached to rods pivoted on the boom and rock up and down at 45 to 50 oscillations a minute, 2 nozzles moving up as 3 move down, being powered by a take-off from the pump crankshaft through an auto transmission. The guns, spaced 1½ to 2 ft. apart, are fixed at slightly less than a 90° angle to each other. The machine averages 24 500-gallon tanks per 10-hour day covering 1½ to 2 acres per hour. The work is reported to be as good as hand work and the cost about one-half.

261. LINDGREN, D. L., AND LADUE, J. P.

634.3-2.752: 632.951

Effect of DDT on three scale insects.

Calif. Citrogr., 1944, 29: 350, bibl. 1.

A report of laboratory studies on the effect of DDT on three major scale insects of California carried out at the Citrus Experiment Station. Suspensions of DDT in water had no effect on purple scale (*Lepidosaphes beckii*) or on red scale (*Aonidiella aurantii*), when past the second moult. Both scales are armoured. The unarmoured black scale, *Saissetia oleae*, was killed (95%) at any stage. Crawlers of red and purple scale were inhibited from settling in the field on leaves up to 20 weeks after spraying with 2% kerosene oil + ½ lb. DDT to 1 gal. kerosene. The kill was further increased from 86% to 98% with the addition of ½ lb. ground cubé root to 1 gal. kerosene.

262. BARTHOLOMEW, E. T., SINCLAIR, W. B., AND LINDGREN, D. L. 634.31-2.944

Absorption of HCN by Valencia orange fruits and leaves.

Calif. Citrogr., 1944, 29: 309-10, bibl. 4.

Experiments are described relating to the effects of atmospheric pressure *versus* partial vacuum on the absorption of HCN by Valencia orange fruits and leaves. The results are summarized as follows: The results of the experiments with Valencia orange leaves showed that (a) the amounts of HCN absorbed by leaves fumigated at atmospheric pressure were always less than the amounts absorbed by leaves fumigated at the same time of day but at partial vacuum; (b) the amounts of HCN absorbed by leaves fumigated either at atmospheric pressure or at partial vacuum were always less in leaves picked and fumigated in the morning than in those picked and similarly fumigated in the afternoon; (c) the amounts of HCN absorbed by leaves fumigated at atmospheric pressure in the afternoon were, with one exception, greater than the amounts absorbed by leaves fumigated at partial vacuum in the morning; (d) leaves picked at 8 a.m. absorbed less HCN than those picked at 10 a.m., 1.30 p.m. or 3.30 p.m.; and (e) the amounts of HCN absorbed did not appear to be influenced by variations in the moisture content of the different samples of leaves.

263. VASILJEV, A. V. 58
Sergei Gaigorjevič Ginkul. [Russian.]
Sovetsk. Botan., 1941, No. 3, pp. 202-3.
Ginkul was an authority on sub-tropical plants. He worked at Suhum and Batum where he utilized his knowledge of plant acclimatization in introducing many species to the U.S.S.R. A list of his published works and also manuscripts are given at the end of the notice.

264. ROY, K. K. G. 633.492
Sweet potato: an emergency crop.
Ind. Fmg, 1944, 5: 218-9.
The significance of sweet potatoes as an emergency crop in India is stressed and it is pointed out that on an acre to acre and bulk to bulk basis sweet potatoes will outyield every other food crop within a comparatively short period of time. It is thought that yields in South India averaging at present 4-5 tons per acre could be doubled with careful cultivation and good manuring.

265. WEAVER, B. L. 633.492
How to grow sweet potatoes in Illinois.
Circ. Ill. Coll. Agric. Ext. Serv. 580, 1944, pp. 12.
Detailed instructions are given on the cultivation of sweet potatoes, which are a successful crop on well-drained sandy or light-textured soils in southern and central Illinois.

266. DRAIN, B. D., AND OTHERS. 633.492
Sweetpotato culture. Varieties, spacing, date of setting, date of digging, diseases, fertilizers.
Bull. Tenn. agric. Exp. Stat. 189, 1944, pp. 24.
Sweet potato variety trials have been conducted for 10 years at the Mercourt Experiment Station, Clarksville, and for shorter periods at two other Tennessee Stations. While Nancy Hall and Nancy Gold gave the highest yields of all table varieties tested, the last-named variety, a bud sport of the former, seemed to be superior in appearance, vitamin content and quality. Bunch Porto Rico, when vining varieties were not permitted to grow over it, equalled vining strains but was more convenient to grow. Spacing: The tabulated data indicate that optimum yields are obtained by spacing the plants slightly under 12 in. Date of digging: The later the potatoes are dug the larger is the yield, but the danger of cold injury has to be avoided. Diseases: More than half of the losses from diseases, which average 20% in Tennessee, are due to rotting during storage, in transit or on the market. Apart from harvesting in dry weather and careful handling the chief precautionary measures consist in curing for 12-14 days at 85° F. and 85% relative humidity and keeping the storage houses at 55° F. and 85% relative humidity. Stem rot and black rot and their control are the field diseases dealt with. Trials show that growing sweet potatoes from disease-free slips will result in a complete stand. The second half of the bulletin is devoted to two reports on fertilizer experiments for a number of soil types, treated under two headings: (1) Soils poor in phosphate, (2) Soils naturally well supplied with phosphate. The results, including those from trials on green manuring and nitrogen sources, are discussed in detail. Six hundred pounds per acre of a 5-10-5 and a 8-5-5 fertilizer mixture for soil classes (1) and (2) respectively are the recommended formulae under usual conditions in wartime. Suggestions are made how the injurious effect on the roots of young plants of heavy nitrogenous fertilizer applications may be avoided.

267. HANSFORD, C. G. 633.492-2.8
A probable virus disease of sweet potato.
E. Afr. agric. J., 1944, 10: 126-7.
A preliminary account is given of a new virus disease of sweet potato, which is now occurring on a serious scale in Uganda and other East African territories. Observations suggest that the virus is spread by white flies (*Aleyrodidae*), apparently close allies of the *Bemisia* species known to be the vector of cassava mosaic. At present the raising of immune varieties would appear to be the only promising control measure.

268. DŽIDŽAVADZE, S. Š. 633.85
New data concerning oil-bearing plants in the Soviet moist sub-tropics. [Russian.]
Sovetsk. Botan., 1941, Nos. 5-6, pp. 43-8.
The following nine species of oil-bearing plants are briefly described: (1) *Mallotus japonicus*—a relative of the tung tree, and bearing abundant fruit, each containing three soft-coated seeds. The weight of the kernel is 50% of that of the whole seed. The weight of 1,000 seeds is 80 g. The seed contains 37.92% of oil resembling tung oil. It is very viscous; its refractive index is 1.5130; it dries rapidly, a film of it on glass is durable but not elastic. It gelatinizes at 190° C. in diffused light; and it contains eleostearic acid. (2) *Manihot carthagenensis*. It is a tropical plant, likes sandy soil, yields nectar and is decorative. Though the quantity of oil obtainable from the seed is not much influenced by the date on which the seed is gathered, the quality of the oil, which is semi-drying, improves as the seed ripens. Ripening of the seed does not take place evenly in all parts of the plant. (3) *Sapium sebiferum*. Two products are obtained from the seed; the oil contained in them, and the waxy substance covering them. The wax yields a hard fat, the iodine number and refractive index of which diminish as the seed ripens, and is suitable for soap making. The oil dries quickly, having an elastic film, and its iodine and refractive values, unlike those of the fat from the wax, increase as the seed ripens. (4) *Buxus sempervirens*. The oil-bearing properties of this shrub have not been much studied. The yield of oil from the seed has been estimated at 1 ton per hectare, a figure which astonishes the author of the article. The fruit ripens at the end of July or the beginning of August (in Batum). The weight of 1,000 seeds is 150 g. The seeds contain up to 45% of oil, the quality of which improves as the seed ripens. The oil dries more rapidly than linseed oil, leaving an elastic, smooth and shiny film. On being heated it thickens and changes colour, but does not gelatinize. Heat also causes it to become sticky. (5) *Salvia splendens*—a decorative, herbaceous annual, the seeds of which contain 32% of a rapidly-drying oil having an iodine value of 160.3 and a refractive index of 1.4810. The oil improves as the seed ripens. It has not yet been fully studied, but may be suitable for paints and varnishes. (6) *Daphne pontica*—a decorative, evergreen, wild shrub, indifferent to the soil in which it happens to grow. It may be propagated vegetatively or by seed. In addition to the oil from its seed, it is a source of tanning material and medicinal substances. It gives an abundant yield of seed containing 59.45% of oil, the refractive index of which is 1.4772 and the iodine value 106.17. The oil dries slowly, leaving a hard and durable film; there is thus a discrepancy with the low iodine value, and it is not possible to say on the evidence of one sample whether the oil is drying or semi-drying in character. (7) *Euscaphis staphyloides* is a decorative, small tree, the seeds of which yield a drying oil having a refractive index of 1.4809 and producing an elastic and smooth film. (8) *Hamamelis virginiana*—a decorative tree or shrub giving an abundant yield of fruit, the seed of which contains 52.1% of a drying oil having a refractive index of 1.4772 and leaving a somewhat soft film. The oil is suitable for food. (9) *Eryngium maritimum*—a herbaceous perennial found growing on sands near the sea. The seeds contain 43.51% of oil. The refractive index of the oil at 20° C. is 1.4750, its iodine value 103.18. The oil is slow to dry and is classified as semi-drying. In most respects it resembles that of *Pimpinella anisum*. The seeds, after ripening, remain on the plant a long time.

269. DU PREEZ, D. 634.421
Hints on guava culture.
Fmg S. Afr., 1943, 18: 388, 396, bibl. 2.
Guavas in South Africa are being widely planted because of present high prices. They require a high soil moisture especially when young fruits are setting. They should be

propagated vegetatively by layers, root cuttings, hardwood cuttings or suckers, for the seedling progeny, even from a single selected fruit, is very heterogeneous. Budding as a method of propagation has not shown promise in South Africa [it succeeds well in Florida, California and Java.—ED.] The best yielding, keeping and canning guava in S. Africa is of local origin and is known as Fan or Basson. The Fruit Research Station, Stellenbosch, asks for successful

local varieties to be sent for trial with a view to selection in the attempt to establish good standard varieties.

270. LINDGREN, D. L., AND SINCLAIR, W. B. 632.752: 632.944
Absorption of HCN by resistant and non-resistant scale insects.
Calif. Citrogr., 1944, 29: 341, 356, bibl. 4.

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271. NOSTI, J. 633/635(669.91)
Miscelánea agrícola I. (Notes on the agriculture of Spanish Guinea.)
Bol. agric. Territ. españ. Golfo de Guinea, 1943, Semester 1, pp. 79-97, being *Publ.* 7.

Notes are given on a number of agricultural matters relating to Spanish Guinea. *Eugenia dombeiyii*, known as the Brazilian cherry, is an introduction which thrives and has a fruit suitable for jam or preserves. Macerated leaves of *Tephrosia vogelii*, soaked for 2 days, make an excellent insecticide (1 kg. leaves, 0.3 kg. soft soap, 10 l. water). The plant is also a good green manure. The dwarf palm, *Sclerosperma manii*, produces nuts which contain a very hard vegetable ivory superior to that of *Hyphaene thebaica*. Growth of the cocoa pod after fertilization is very irregular. The time that pineapples take to bear fruit in Fernando Po varies with the class of pine and the method of reproduction. Plants from crowns (var. Smooth Cayenne) mature fruit in 16 months. Plants from sections of the stem take 8 months after sectioning before the new growths are ready for transplanting and a year more to mature fruit. If suckers are taken off the parent plant after the fruit has been cut, the best sizes to take are those 60 cm. long; these will ripen fruit in 12 months. Larger sizes are apt to flower at once and produce a small fibrous fruit; smaller sizes take longer to develop. The mangosteen could probably be successfully grown, though the one existing at present in the island (Fernando Po) grows very slowly—0.80 m. in 5 years. *Caloncoba welwitschiae* is a tree of which the nuts produce a certain quantity of chaulmoogra oil. An efficacious insecticide against the external parasites of man can be made from a paste of the pounded bark and water. The wood is extremely hard and durable and therefore popular for the uprights in hut building. Contrary to popular opinion that the pineapple Smooth Cayenne grows best in poor soil, pines grown in rich soil may average 8 kg. in weight against the 2 kg. of a pine from poor soil. Differences exist in the pruning of liberica and robusta coffee. Liberica will fruit on wood from one to four years old and for two or three years in succession at the same node. The difficulty in pruning is to decide what wood has passed its maximum fruiting powers. In robusta, which fruits only on wood of one to two years and not two years in succession at the same point, all wood over three years that has fruited should be removed.

272. FAULKNER, O. T. 631.459
Experiments on ridged cultivation in Tanganyika and Nigeria.

Trop. Agric. Trin., 1944, 21: 177-8.

Ridged cultivation has been shown in Nigeria and Tanganyika to give higher yields than flat cultivation, in some cases very much higher. The broad ridge does better in this respect than the narrow one. On this assumption the added value of ridging for the prevention of erosion is pointed out. Ridging should follow the contour to be effective against erosion, but strict accuracy is not necessary and would be beyond the powers of the African farmer. The fact that accurately contoured ridges are not parallel is an added inconvenience. Inaccurately contoured ridges exert no erosion control, but if their furrows are crossed by little bars of earth at suitable intervals according to the control desired, the flow of water will be entirely held up in small showers

and restricted to the surface of the water in heavy rain. A slope so treated that still cannot retain the water is incapable of successful contour treatment at all, and should be dealt with by terracing. Objections to bars are nil if they and the ridges are hand-made, but if the ridging is worked with drawn instruments such as horse-hoe and plough, then implements have to be lifted over the bars or the bars remade after their passage. In this case it would be best to contour fairly accurately by eye and to place a few bars where required. The objection that bars mean bringing up unfertile subsoil from the bottom of the furrow is unimportant.

273. HOON, R. C., AND DHAWAN, C. L. 631.41: 631.67
A study of the fertilizing value of the silts carried in suspension by the rivers of the Punjab.
Ind. J. agric. Sci., 1944, 14: 69-74, bibl. 5.

Analyses of large numbers of silt samples collected by the Irrigation Research Institute, Lahore, showed that the silt of the Punjab rivers contains insufficient plant nutrients to be of any significance as a fertilizer. From the physical point of view, silts from the Sutlej and Indus were found to have a somewhat deleterious effect on soil texture in the irrigated areas, while no change in physical soil conditions is brought about by irrigation from the remaining rivers. Silts high in calcium carbonates may be harmful.

274. CANNON, R. C. 633.71-1.874
Green manures in the tobacco rotation.
Qd agric. J., 1944, 59: 69-75.

After stressing the importance of including a green manure in the tobacco rotation the author discusses the merits of some green manure crops under Queensland conditions. The discussion is based on preliminary results obtained in the first stages of long-term experimental work inaugurated at Mareeba in 1941. Because of their resistance to nematodes and other desirable characters, so far the following three leguminous crops are classed as suitable: Peanuts, velvet beans, and *Crotalaria goreensis*. The last has the disadvantage of comparatively poor germination and slow growth in the earlier developmental stages. But when these difficulties have been overcome, for which some cultural measures are suggested, *Crotalaria* should be very valuable in view of the excellent soil cover and the good body of green material it provides. Growers are discouraged from including cowpeas and Sudan grass in the rotation.

275. PRUTHI, H. S. 633.71-2.8
Leaf-curl disease of tobacco in India.
Ind. Fng. 1944, 5: 220-3, bibl. 6.

Five types of leaf-curl can be distinguished by their symptoms in northern India, and are designated as A, B, C, D, X. In an extensive investigation carried out at the Imperial Agricultural Research Institute, New Delhi, it was proved that the white fly, *Bemisia tabaci*, is the chief vector and that the virus can be transmitted from 12 alternate hosts which are listed. There is at least one alternate host for every type of leaf-curl. Sunnhemp and zinnia and the weeds *Ageratum conyzoides* and *Euphorbia hirta* appear to be the most important sources of infection. The seasonal histories of tobacco and the various alternate hosts are diagrammatically shown in a chart. The eradication of all alternate hosts, a control measure recommended in Java and Africa, seems

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impracticable in India, where the white fly will thrive on over 100 hosts apart from the dozen more important ones mentioned in the article. However, preliminary experiments with rosin compound conducted at Pusa tend to show that satisfactory control may be expected if spraying or dusting is started in the seed bed and carried out for two months at 10-day intervals. Further tests on a field scale and in various parts of the country are necessary.

276. ASSAM (WOODFORD, R. C.) 633.72
Report on tea culture in Assam for the year 1942.
 Department of Agriculture, Shillong, Assam, 1944,
 pp. 13.

It is noted that the Scientific Department of the Indian Tea Association was unable to continue its investigations during 1942 owing to the absence of officers on war work and the occupation of the Toklai Experimental Station by the military. Experimental work is not otherwise mentioned in the report.

277. EDEN, T. 633.72-1.84
Studies in the yield of tea: Part V. Further experiments on manurial response with special reference to nitrogen.

Emp. J. exp. Agric., 1944, 12: 177-90, bibl. 15.
 The data presented cover a period of 12 years or 4 pruning cycles, during which the response of tea yield to various manurial treatments was studied at the Tea Research Institute of Ceylon. The most striking effect was obtained by the use of nitrogen, where a remarkable linear relationship exists between dose and crop up to an application of 80 lb. per acre and where the maximum yield response of 6.5 lb. (dry weight) per lb. of nitrogen applied has been reached. Owing to the fact that the crop is the product of the vegetative growth, the effect of nitrogen increases with time within each pruning cycle and from pruning cycle to pruning cycle as the size of the bush increases. The response during the first year after pruning must be expected to be poor as a result of the initially leafless condition of the plant. Applications of P_2O_5 were found to produce a moderate response up to 30 lb. per acre, while the effect of potash on yield was nil. However, with phosphate and potash, particularly the latter, the phosphate and potash content respectively in the foliage increased, whereas nitrogen produced the least change in leaf composition. There was a high correlation between leaf and wood formation.

278. GADD, C. H. 633.72-2.76
A further note on an unusual correlation between insect damage and [tea] crop harvested.

Ann. appl. Biol., 1944, 31: 250-4, bibl. 4.

It was previously shown by the author that a positive correlation ($r = +0.927$) exists between the yield of tea and the damage caused by the shot-hole borer beetle (*Xyleborus fornicatus*). This correlation was found to persist also in the third year after pruning when the anticipated reduction in infestation occurred, which therefore may be regarded as dependent on the age of the bushes from pruning. As in previous trials increased soil fertility was associated with increased beetle damage, but no significant results could be obtained with different fertilizer treatments. The diminished pest injury during the third year, however, allowed the beneficial effect of nitrogenous manures to be demonstrated. An explanation of the fact that the same factors apparently favour the growth of the tea bush and the multiplication of the beetle may be sought amongst the interrelations between the beetle, the ambrosia fungus on which it lives and the tea bush. Methods of measuring beetle infestation are discussed. The investigation was carried out at the Tea Research Institute of Ceylon.

279. RAU, S. A. 633.72-2.654.1
A practical method of testing tea nursery soils for the root-knot eelworm.

Plant. Chron., 1944, 39: 347.

The general soil infestation with root-knot eelworm in recent years has made it necessary to test soils intended for a tea

nursery for the presence of the pest. The following simple method is suggested. A few small containers are filled with soil taken from as many places as possible in the proposed site. Twelve to fifteen *Tephrosia vogelii* seeds—a highly susceptible plant—are sown in each bin. After 4 weeks the roots of the carefully lifted plants are examined for galls which are readily detected. It is claimed that this method is safer than the usually employed microscopic examination.

280. THOMAS, A. S. 633.73: 581.144.2
Observations on the root-systems of robusta coffee and other tropical crops in Uganda.

Emp. J. exp. Agric., 1944, 12: 191-206, bibl. 9.
 The author's observations on robusta coffee and other tropical crops in Uganda throw an interesting light on the value of some cultural practices, which tend to follow the tradition of temperate climates too closely without taking into consideration the differences in the development of the root systems between temperate and tropical crops. Measurements of robusta coffee roots made with the help of a soil auger at many localities demonstrated that a great concentration of feeding-roots very close to the surface is the rule, where the plant grows without interference. A photograph of a carefully excavated root system shows a distinct tap root terminating abruptly at a depth of about 45 cm. and a plate of lateral roots. This finding indicates that much labour is wasted in digging deep holes for coffee and other crops, while much more benefit would be derived from a general thorough cultivation. In order to test this point robusta coffee at Kawanda was put into ground which had been deeply dug, but in which no large holes had been made. The coffee made excellent growth and began to ripen its first crop within 2 years of planting. In view of the shallow rooting of the robusta coffee plant the customary deep digging must be regarded as a harmful cultivation method, but clean weeding appears to be desirable in order to remove heavy competition with the roots of the crop. Deep cultivation is often believed to increase soil permeability. However, the soil resistance of many Uganda coffee plots, measured by counting the number of knocks required for the Veihmeyer auger to penetrate into the soil, was found not to be reduced by cultivation, but, if anything, rather to be increased by it. From the point of view of root competition the right choice of shade trees and cover crops is essential. Under Uganda conditions *Ficus natalensis* and *Leucaena glauca* respectively have proved beneficial. There is, furthermore, evidence that in the relatively dry climate of the Protectorate crops grow better at wider spacings than are employed in wetter tropical countries. Finally, the importance of root studies is emphasized.

281. STOFFELS, E. H. J. 633.73-1.521
La sélection du caffier arabica à la Station de Mulungu. (Arabica coffee selection at Mulungu Experiment Station, Belgian Congo.) [English summary pp. 3.]

Publ. Inst. nat. Étude agron. Congo Belge (I.N.E.A.C.) Sér. sci. 25, 1941, pp. 72, bibl. 15, 50 Fr.

The variation between yields of different arabica coffee trees is very great and irregular and is here attributed largely to environment and cultural treatment. Dieback is also closely related to environment and the method of pruning. Disease resistance varies with the individual. Selection of mother trees cannot be satisfactorily made until three or four crops have been recorded, and the same applies when determining the efficiency of a population. In poor yielding at Mulungu 50% of the trees produce only 0.340 kg. of cherry per tree while their average yield is 2.540 kg. The replacement of the lowest yielders to the extent of 10% of the trees in the plantation would pay, but they could only safely be determined after several years of recording. Any increase in yield of a plantation is mostly provided by the lower yielding 60%. These low yielders often respond quickly to improved cultural conditions. Trees whose average yield is double the average per tree of the rest of

the plantation amount to about 1% of a population. They should be marked for selection. Brown-tip arabicas are more efficient than green-tip. Yield records alone are not sufficient data on which to judge a mother tree; an appreciation of the surroundings and of the tree's condition must be included. Theoretically in comparing progeny yields a 10% superiority over 3 harvests would be an adequate indication and would require the recording of 146 trees per progeny to establish. To establish a difference of 20%, 33 subjects per progeny would be enough, but not if the soil is unevenly fertile. While the density of beans from the most varied environments is fairly stable, the size is increased by shading unless this is excessive. The beans are heavier on the lower branches and the yield of the secondaries is higher than that of the primaries. Bean measurements are so variable from year to year that they have little diagnostic value, and the same in a less degree applies to weight and size. There is a positive correlation between weight of beans and weight of cherry, but trees producing large cherries are rarely good yielders. There are poor yielders among the small berried trees also. Bean weight (per 100 bean lots) was not influenced by the size of the current or preceding harvest. High yielding progenies are often so because of their resistance to die-back. The coffee tree is mainly strongly homozygotic and in such cases habit, bean shape, resistance to *Colletotrichum* and other characters are transmitted by the mother-tree to its descendants.

282. GILBERT, S. M. 633.73-1.535
A note on the cost of rooting cuttings of *Coffea arabica*.

E. Afr. agric. J., 1944, 10: 109-10.

It has been worked out at the Coffee Research and Experimental Station, Lyamungu, Moshi, that a rooted cutting of *Coffea arabica* costs about 38 cents in Tanganyika Territory.

283. POSKIN, J. H. 633.73-1.542
La taille du caffier robusta. (Pruning *Coffea robusta*.)
Publ. Inst. nat. Étude agron. Congo Belge (I.N.E.A.C.),
Sér. tech. 31, 1942, pp. 59, bibl. 22.

Various methods of pruning robusta coffee suitable for every occasion are described. Considerable discussion is centred on the comparative advantages of single-stem formation as practised in the Belgian Congo or multiple-stem as advocated elsewhere. The differences are as follows. *Single-stem*=S, *Multiple-stem*=M. S. The main stem is stopped at 1.80 m. M. Numerous stems allowed free growth. S. Removal of all suckers or water shoots. M. Only surplus suckers cut out. S. Crop borne on secondary growth. M. Crop exclusively on primaries. S. Regular maintenance pruning. M. Annual removal of exhausted aging branches. S. Some kind of soil cover is necessary. M. The soil is rapidly protected by the growth of the coffee. S. Continual maintenance work. M. Maintenance requirements much reduced. S. Yield early and heavy. M. Yield early and very heavy, representing in the cases examined a total increase of 200 kg. of marketable coffee per ha. per year calculated over a 5 year period. While it would not be advisable to transform the present single-stem plantations into multiple-stem, undoubtedly all new plantations should be grown on the multiple-stem system.

284. DE SOUZA, A. J. 632.951: 633.73
O emprego de *Tephrosia candida*, D.C., na cultura cafeeira. (The use of *Tephrosia candida* in coffee plantations in Brazil.)

Rev. D.N.C., Rio de J., 1944, 23: 185-97, bibl. 8.

The value of *Tephrosia candida* as a shade tree, windbreak, and leguminous green manure for coffee in Brazil is discussed. A light and very porous charcoal can be made from the wood. The wood decomposes slowly and, being thus less suitable for green manuring than the foliage, forms a useful source of firewood.

285. FERREIRA, R. DA C. 633.73
Replantas das falhas no cafézal. (Replacements in the coffee plantation.)
Rev. D.N.C., Rio de J., 1944, 23: 31-3.

Replacement or transplanting of coffee can be made with young plants in leaf, 20 cm. in height, or better, when about 1 year old, during the rains or as stumps cut back to 15 cm. from the ground. Stumps can be planted at any time, but for preference in the autumn and after a shower. The nursery bed is well watered beforehand and sufficient plants for the day's work are pulled and wrapped in moist sacking. The planting holes should have been previously prepared and manured if necessary. In each hole 5 or 6 plants are inserted by means of a pointed stick and the ground is levelled off. With indirect planting the seedlings are first grown on in baskets containing about 6 for 3 months, transported thus to the planting sites and taken from the baskets with soil on the roots. The plants should have 2 pairs of leaves, and 4 to 6 should be set in each hole. Replacements in plantations under 2 years old can be made by sowing on site either from beans which have been depulped or better by whole cherry dried in the shade, since the resultant seedlings seem to catch up with the previous plantings more quickly. Basket plants should, however, be used if available. When the plantation consists of grown trees the supplies should be from basket plants, since these start away more freely.

286. MELVILLE, A. R. 633.73-2.754
Antestia control.

Mon. Bull. Coff. Bd Kenya, 1944, 9: 89.

A pyrethrum residue is now available in Kenya for the control of *Antestia* on coffee as a substitute for pyrethrum, which is unobtainable. The material contains about 1% of pyrethrins and some residual kerosene. Experiments carried out with this powder have shown that an application of 6 times the normal dose of pure pyrethrum can reduce the pest by 75%. One-half of the quantity necessary for each tree should be applied to the tree itself, the other half to the ground on the leaf-drop area to prevent the recovery of semi-paralysed bugs. It is important also to cover the stem with the dust. Notes on suitable dust pumps are given.

287. CHEESMAN, E. E. 633.74-1.521
Notes on the nomenclature, classification and possible relationships of cacao populations.

Trop. Agric. Trin., 1944, 21: 144-59, bibl. 15.

It is argued that the cultivated, semi-wild and wild cacaos form but one botanical species, *Theobroma cacao*, and that the specific names *T. pentagona* and *T. leioarpa* apply to certain forms, which, although strikingly different in fruit shape from the bulk of the local populations in which they occur, do not merit specific rank. The names Forastero and Criollo which tend to become confused are redefined. Forastero should cover (a) Amazonian Forasteros, which have evolved in comparative isolation, and (b) hybrid populations which contain certain Criollo elements and are better distinguished as Trinitarios. Criollo are the original cacaos of Colombia, Venezuela and Central American countries. They have been cultivated for a long time, as the high quality of their product testifies, and the country of origin is in doubt. Criollo presents a number of geographical types which, unfortunately for students of variation, have of late years become contaminated with introduced Trinitarios. Amazonian Forasteros occur wild and semi-wild along the main Amazon rivers in considerable variation. The two most uniform populations are the Cacao Nacional of Ecuador and the Brazilian Forastero, of which the plantations of the Gold Coast consist. Vigour and high yield characterize this group. Trinitarios are highly heterogeneous populations not known in the wild state. Presumably they originate from a mingling of South American Criollo and Amazonian Forastero stocks. The best

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known population is the cacao of Trinidad. The outstanding characteristic is the extreme tree to tree variability. The group contains no definable varieties; the only definable unit is the clone.

288. JOLLY, A. L. 633.74-1.55

Biennial bearing in cacao.

Trop. Agric. Trin., 1944, 21: 164-5.

A statistical analysis of the individual 10-year yield records of a 27-year-old field of seedling cacao has detected no tendency to biennial bearing.

289. HARDY, F. 633.74-1.4: 581.144.2

Some soil relations of the root system of cacao.

Further results of investigations in Trinidad.

Trop. Agric. Trin., 1944, 21: 184-95, bibl. 8.

Full laboratory and field data are tabulated and discussed which indicate the close relationship existing between certain physical and chemical features of the soil and the distribution of roots of the cacao tree in Trinidad. The organic matter content is responsible for the degree of non-capillary pore space in the clay soils examined and for the nutrient status. The chemical composition of soil organic matter is primarily decided by the mineralogical composition of the parent rock, since circulation of nutrients transfers soluble substances from the decomposing rock to the soil surface via the growing plant. Soil acidity is an index of nutrient deficiency. Root distribution is sparse in the relatively high acid "dead layer" which immediately underlies the humic topsoil in nutrient deficient soils. Thus the organic profile appears to be the main soil character influencing the distribution and development of roots of the cacao tree. Shallow cacao root-systems, such as develop in poor compact acid clays or in sands having a high water table, show a long, thin tap-root and a sparse but widespread superficial lateral root system together with a well-marked fibrous surface root mat associated with a thin crumb layer below the rotting leaf litter. Deep cacao root-systems developed in rich, well-structured calcareous clays or in free-draining sand possess a short, stout tap-root, an abundant, much-divided, deeply-set, lateral root-system and a diffuse fibrous root mass that exhibits small tendency to form a surface mat, though a thick crumb layer may cover the soil. The possibility that the fibrous root mass that develops when aeration and soil moisture are adequate may function as a producer of a growth-promoting hormone is considered. The growth hormone discovered by Dr. F. W. Went of the California Institute of Technology is only found in rootlets that are surrounded by moist air. The discovery serves to emphasize the importance of the surface crumb layer and of the harmful effects that may follow on its erosion.

290. BAKER, R. E. D., AND DALE, W. T. 633.74-2.4

Witches' broom disease investigations. VIII.

Observations on fan broom formations and loss of pods at River Estate from September 1942 to September 1943, and IX. Loss of pods at River Estate. Results to April 1944.

Trop. Agric. Trin., 1944, 21: 170-5, bibl. 1, and 175-6.

VIII. Witches' broom disease on the Department of Agriculture's River Estate, Trinidad, is more intense than on any other estate in Trinidad. As an example it is mentioned that over 1,000 brooms of all types were removed from Tree I in July 1943, although the tree had been completely cleared of brooms 2 months before. Fan brooms removed from the plot of 76 trees amounted to 18,034 in 8 months compared to 10,253 for the whole of the previous season. This does not include the 7,515 cushion forms also produced during this 8-month period. From January to October 1942, only 10% of the pods harvested were destroyed; from October 1942 to September 1943 this rose to 44%. No evidence could be found of pod resistance in individual trees, whereas in fan and cushion broom forma-

tion there is statistical evidence for resistance. There was no correlation between the percentage of witches' broom-diseased pods in 1942-3 and the total number of brooms produced from 1942-3. So far (the 4th year of the attack), the trees themselves have been little damaged by the attack and their yield capacity is practically unimpaired. There is, therefore, a possibility that a fan broom with plenty of leaves and chlorophyll available might be practically self-supporting as regards carbohydrates. Trees which set the bulk of their crop in the dry season show considerable disease avoidance to pod attack. Thus a clone might be found which fulfilled this condition, but it would also have to show resistance to fan brooms and not be of a free-flowering type that might be severely damaged by cushion brooms. Such a type, unfortunately, is not likely to be a high yielder, moreover it might not behave in the same manner in all parts of the island. In any case the distribution of low yielding clones is not likely to be favourably received by planters.

IX. Tables are given which confirm the previous season's findings that, until April 1944, when the experiment was abandoned, the diseased pods have been at a maximum in January and February. A much heavier crop was produced for the 1943-4 season, i.e. from September till the experiment ended in April, than for the previous season in spite of witches' broom being more severe. Some high-yielding trees have maintained their yield but no signs of resistance have been discovered.

291. BAKER, R. E. D., AND DALE, W. T. 633.74-2.4

Witches' broom disease investigations. X. Loss of pods in I.C.S. clones at River Estate during 1943, and XI. Observations on the effect of planting on witches' broom disease at River Estate.

Trop. Agric. Trin., 1944, 21: 196-8 and 198-9.

X. I.C. Selection cacao clones examined for the first time showed, with the exception of I.C.S. 3, a considerable degree of pod disease avoidance through setting their fruits at a time when severe infection by witches' broom disease was not possible. I.C.S. 1, 4, and 6 show somewhat more resistance than I.C.S. 3, 5, and 8. Since disease avoidance has already been eliminated, the difference may be true resistance. Statistical treatment has not been possible yet. Clones from other sets which show some promise of true resistance are 45 and 98. Of these clones 1, 6 and 45 possess other desirable characters such as high yield, high pod value, quality, etc. The results are somewhat at variance with those for seedling trees (see previous abstract) where no evidence of pod resistance could be found.

XI. A spacing experiment did not uphold the theory that close planting cacao has fewer pods attacked by witches' broom disease, nevertheless the close planted trees are standing up better to the disease and are yielding far more cacao per acre than those spaced more widely.

292. HUMPHRIES, E. C. 633.74-1.56

Some problems of cacao fermentation.

Trop. Agric. Trin., 1944, 21: 166-9, bibl. 10.

Cacao manufacturers prefer fermented beans. Certain advantages and disadvantages of fermentation are discussed. Advantages:—(1) improvement of flavour and aroma by conversion of tannins to brown substances; (2) decrease in percentage of theobromine; (3) enrichment of the bean with vitamin D, though mostly in the shell which has only a limited use as a by-product. Disadvantages:—(1) much loss of dry matter; (2) loss of fat; (3) loss of protein, soluble sugars, mineral salts and possibly other substances of nutritional value.

293. HERNÁNDEZ MEDINA E. 633.821

Studies of the shade requirements of vanilla.

J. Agric. Univ. Puerto Rico, 1943, 27: 27-37, bibl. 5.

Experiments conducted at the Puerto Rico Experiment Station of the U.S. Department of Agriculture, Mayagüez,

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have shown that *Vanilla fragrans* thrives best in shade conditions which admit one-third to one-half the normal sunlight when the sun is directly overhead. With more sunlight the vines decrease in vigour, the internodes become shorter, the leaves droop and the plant takes a yellowish-green, almost chocolate colour. The effect of different degrees of shade is illustrated by photos of 15-month-old plants grown under different light conditions.

294. CHOWDHURY, S. 633.841

Cultivation of pan in Sylhet.
Ind. Fmg., 1944, 5: 122-4.

The cultivation of pan, *Piper betle*, in Sylhet, Assam, is described under the headings: Soil requirements, varieties, cultivation, irrigation and manuring, harvesting and cost of production.

295. ASTHANA, R. P., AND MAHMUD, K. A. 633.841-2.112

Tip-burn of Piper betle in the Central Provinces.
Curr. Sci., 1944, 13: 234.

The symptoms of tip-burn of *Piper betle* are described, a non-infectious widespread trouble caused by excessive loss of moisture from the leaves due to hot and dry weather conditions prevailing in March and June in the Central Provinces of India. Experiments conducted at Nagpur have shown that the damage associated with this disorder can be largely reduced by (1) shading the gardens, (2) lowering the vines by the second week of March at latest, and (3) adequate irrigation.

296. SABNIS, T. S., AND MEHTA, T. R. 633.854.54

Improvement of linseed in the United Provinces.
Ind. Fmg., 1944, 5: 224-6.

About 22% of the linseed grown in India is produced in the United Provinces on an area of 9 million acres. The most popular varieties are briefly described. An account is given of the breeding work carried out at Cawnpore which aims at raising rust-resistant types combining height (for length of fibre) with satisfactory seed production.

297. VACHHANI, M. V. 633.88

Growing plantago in Sind.
Ind. Fmg., 1943, 4: 417-8.

The feasibility of growing the indigenous medicinal plant, *Plantago ovata*, under irrigation in Sind as an economic crop has been demonstrated at the Agricultural Research Station, Dokir. Cultivation methods are described and yield figures are given.

298. LÉFÈVRE, P. C. 633.88.51-2.75

*Introduction à l'étude de *Hélopeltis orophila* Ghesq. (Introduction to the study of *Helopeltis orophila*, a plant bug pest of *Cinchona*.)*
Publ. Inst. nat. Étude agron. Congo Belge (I.N.E.A.C.)
Sér. sci. 30, 1942, bibl. 9, 45 fr.

The biology and methods of control of *Helopeltis orophila*, a bug attacking the leaves of *Cinchona* in the Belgian Congo. Biological control only succeeds spasmodically. Hand-picking is not entirely satisfactory as the smaller stages are disregarded by the pickers. Dusting with pyrethrum powder mixed with 3 times its bulk of wood ashes is a fairly effective control. Spraying with pyrethrum solution is also effective, but local labour seems to take more kindly to dusting.

299. LAMB, T. R. 633.912

The Benin rubber industry. Observations made during a survey carried out in 1942.
Farm and Forest, 1944, 5: 35-7.

The planting of *Hevea* rubber in Nigeria has been done mostly by peasant farmers whose primitive and wasteful methods would surely curdle the blood of an Eastern planter. The efficiency of the dryer, however, which is a small mud-walled room with a mud-walled furnace built inside but fed from without, seems to rival the efficiency of the modern type smoke houses of Malaya, which require

4 days to complete the drying against the African's 2. Diseases and pests fortunately give little trouble. The annual yield per acre is about 200 lb. as a maximum for mature trees of all ages. Latex is coagulated with lime juice or coconut water, the price of formic acid being prohibitive. The importance of cleanliness is unperceived. Since the survey the Agricultural Department has by propaganda succeeded in reducing the waste of latex in tapping and in improving the quality of the rubber produced. As a result the proportion of grade A 1 sheet rubber to total sheet graded rose from 15% to 78% within a year, and in January 1944 four grading stations reported 100% grade A 1 sheet for that month.

300. BROUWERS, M. J. A. 633.912-1.541

La greffe de l'hévéa en pépinière et en champ.

(Budding hevea in the nursery and in the field.)
Publ. Inst. nat. Étude agron. Congo Belge (I.N.E.A.C.)
Sér. tech. 32, 1943, pp. 29, 30 fr.

The method of budding used is the Forkert system. Budding in the nursery produces about 75% success, in the field 89%. The advantages and inconveniences of budding in the field are discussed and a full account of the technique is given.

301. ANON. 633.912-1.55

Effect of winter rest on rubber yields.

*Tea Rubber Mail (undated), from reprint *Plant. Chron.*, 1944, 39: 293.*

An experiment carried out at Dartonfield by the Ceylon Rubber Research Scheme showed that rubber trees which were tapped throughout the year gave a 6% higher yield than trees which were rested for 4 weeks during the period of leaf-fall and refoliation.

302. WATERSTON, J. M. 634.1/8: 551.566.1(72.99)

Fruit culture in Bermuda.

The Government Printer, Hamilton, 1944, pp. 125.

A report of the Bermuda plant pathologist on a visit to Florida and the Bahamas to obtain information on the growing of citrus and other subtropical fruits. As a result of his studies the author suggests that climate and soil conditions in the islands are, on the whole, even more favourable to citrus cultivation than those of Florida. High land values, however, make it advisable to leave the building up of the industry to home gardeners who should receive every assistance in planting up their property. In respect of bananas, papaws and tomatoes the expansion of commercial production is advocated. Bermuda's climate and soil in relation to fruit production are discussed and numerous recommendations for citrus culture are made as to species and varieties, propagation, maintenance of soil fertility, pruning, irrigation, spraying, storage and utilization. Further detailed suggestions are incorporated in an annotated list of fruits other than citrus, followed by a variety list and a plan for a model fruit garden. Many interesting data are presented on fruit varieties and their seasons. The report is most usefully indexed as regards the very many fruits discussed.

303. GIBBERD, A. V. 634.1/8(669)

The Nigerian fruit industry.

Farm and Forest, 1944, 5: 15-21.

A summary is given of the work of the Nigerian Agricultural Department in connexion with the production and overseas marketing of Nigerian fruit. *Pineapple*. Smooth Cayenne was selected for trial shipments, being the most grown of the four superior varieties available. The fruit on arrival was proclaimed as having excellent eating qualities, but its condition showed considerable variation. After some preliminary selection trials attention was concentrated entirely on Smooth Cayenne, which turned out to be identical with the well-known St. Michael pineapple from the Azores. To meet competition with Azores pineapples, which are grown under glass, weigh only 5 lb. and need no refrigeration on the short 5-day journey, suitable methods

had to be found to reduce the weight of the too heavy Nigerian pines (average 7 lb.) and to ensure satisfactory condition after a 2 weeks journey. Experiments with a borrowed low storage temperature chamber successfully determined the best harvesting maturity and transit temperature. The reduction in size was accomplished by planting in double rows at a much closer spacing than was usual locally. The close planting method was found usefully to reduce the period to reach maturity from 18 to 12 months. Shipments made early in the season from November to mid-January arrived in good condition. Later shipments showed much wastage from a physiological trouble possibly associated with atmospheric and soil moisture conditions. Affected pines give no external sign. This trouble is still under investigation. *Oranges*. Nigerian oranges are by comparison with those from exporting subtropical countries inferior in appearance and in texture of pulp, and they contain too many seeds. In Nigeria their colour when gathered is a rich dark green which by the time the fruit reaches Europe is an unsightly mottled yellow. The colouring can be overcome by ethylene gas treatment, but the other faults remain, and in spite of its excellent flavour the Nigerian orange cannot at present compete in the European market. *Grapefruit*. Nigeria can produce high class grapefruit for export. The native population find it too acid so that trial shipments had to be obtained from government plantations and missions. The only suitable variety proved to be Marsh Seedless. This is now to be superseded by the pink-fleshed Seedless Thompson, a fruit of superior flavour which is becoming very popular. Propagation for future export is to be concentrated on this variety only. *Other Citrus*. Tangerines have no prospects. Lemons are promising. *Bananas*. Cultivation for export will not be fostered because shipping companies require a guarantee of adequate regular shipments and therefore the fruit must be grown in extensive plantations to which the small sized farms of the country are not adapted. *Fruit processing*. There is no scope for canned fruit for export, the overseas market being already glutted. A small export trade in citrus juice had been built up before the war. The experience gained proved useful in the manufacture of fruit squashes for local use, imports during the war having ceased. These have proved superior in flavour to imported squashes. Marmalade is profitably made from the skins of the citrus fruits used in manufacture of the squashes. The prospects of an export fruit trade are not viewed over-optimistically. The present system of encouraging the individual farmer to make his own plantation does not lend itself to the regular production of a standardized product. There is, however, a potentially large interior trade awaiting development.

304. HANCOCK, W. G. 588.427

Passion fruit in the tropics.

Qd agric. J., 1944, 59: 79.

Vines of the purple passion-fruit, *Passiflora edulis*, grown in the tropics on the customary vertical trellis, usually quickly succumb to heat injury close to the ground. If, however, the vines are grown over a pergola, so that the plants are set in the centre of the shaded area, they will flourish and bear for several years. Cultivation in the root area should be neither deep nor too frequent and irrigation in dry weather should be adequate.

305. WEDDELL, J. A. 634.1/7-2.78

Fruit-sucking moths.

Qd agric. J., 1944, 59: 89-92.

The life history of *Ophideres fullonica* and other *Ophideres* species is described. Control is by banana lures or, with certain precautions, fallen fruit lures.

306. KERR, J. A. 634.58

The peanut.

Qd agric. J., 1944, 59: 133-40.

The large-scale cultivation of the peanut in Queensland is described. Up till harvest the work is all done mechanically.

At harvesting a mechanical peanut cutter passes its blade under the ridges, cutting the tap-root, so making the plants easy to pull by hand. Threshing is usually done by contractors with machines designed for the purpose.

307. ASENJO, C. F., AND OTHERS. 634.651: 581.192
Chemical changes of the papaya plant during development, with special reference to its proteolytic activity.

J. Agric. Univ. Puerto Rico, 1943, 27: 1-15, bibl. 3.

Tabulated data, assembled at the Rio Piedras Agricultural Experiment Station, Puerto Rico, show that the green fruit rind of *Carica papaya* exhibits the largest amount of proteolytic activity, followed in decreasing quantities by leaf, fruit pulp, stem and root. During the 13 initial months of growth the maximum proteolytic activity in the leaf was reached between the 4th and 9th months. Data on moisture, hydrogen ion concentration and nitrogen content during the first 13 months' development are also presented.

308. SCARSETH, G. D. 634.771-1.415.1
Growing bananas on acid soil.

Agric. Amer., 1944, 4: 188-9, 194-5.

Experiments carried out by the United Fruit Company, which have provided a new approach to the growing of Gros Michel bananas in acid soils on old Panamá-disease abandoned land, are summarized. The following suggestions are made: (1) Select a soil that is of clay texture. (2) Kill the diseased host plants 10 or 12 years ahead of other operations to allow time for biological disinfection, although an effective soil reagent may shorten this to one year. (3) Apply hydrated lime to obtain a pH of 7.5 to a depth of 16 to 24 inches, depending on the pH of the original soil; this might require 12 to 15 tons per acre. (4) Fertilize heavily with phosphate and potash and sow a legume cover crop. (5) Plough in several of these legume crops for 1 or more years before replanting to bananas. Depth of liming appears to be important. In an experiment now in progress, where in addition to meeting the other requirements lime has been added to a depth of 24 inches, no case of disease has occurred in 29 months.

309. TRAVERS, F. 634.774

Future of the pineapple industry in Malaya.

Crown Colonist, 1944, 14: 769-70.

The development of the pineapple industry in Malaya is reviewed. The industry being entirely in the hands of the Chinese is able to produce an excellent canned product at a competitive price, the only pre-war rival of which was Japanese canned mandarin orange. The Hawaiian canned pineapple does not compete. It is exported almost exclusively to America, those which reach Europe being of excellent quality, but higher in price. The Canadian and S. African packs are each distinctive in quality and flavour, much appreciated in England but more expensive. At least 2 years must elapse after the liberation of Malaya before production can start again. It is hoped that attempts to control the industry will be kept within bounds and that the Chinese will be allowed to rebuild, without more interference than is necessary, an industry which has resulted essentially from Chinese effort.

310. SCHAPPELLE, N. A. 634.774-1.8

Fertilizer studies with pineapples in Puerto Rico.

J. Agric. Univ. Puerto Rico, 1942, 26: 41-60, bibl. 6.

The fertilizer studies described were conducted at two localities by the Agricultural Experiment Station, Puerto Rico, with the object of devising a remedy for the decline in pineapple yields, generally experienced by growers in the island. The author summarizes his results as follows: 1. If pineapple plants become even slightly chlorotic during the growing period or the early part of the fruiting period a reduced yield results. 2. The plants in areas where there is a tendency for chlorosis to occur should be sprayed with iron sulphate sprays as diligently and regularly as applications of fertilizers are made. 3. The phosphates

as used at the present time can be reduced to 50 lb. P₂O₅ or less per acre without affecting the yield greatly. 4. Ammonia nitrogen seems to be better than the nitrate form to prevent the chlorotic condition in the Manati field. 5. Slip production and yield of fruit are both favored by vigorous plants, so that if one is increased the other will be increased also. 6. There was no observable effect of fertilizer treatment on 'macho' (abnormal plants) production. 7. Forcing strong plants to early maturity with carbide treatments is a profitable procedure. 8. The relative sizes of pineapples can be predicted fairly accurately by measuring the sizes of the flower stalks only if all the plants in question had the same treatments and growing conditions. 9. If potash is omitted from the fertilizer the quality of the pineapples is poorer judged by acidity, sugar concentration and taste. 10. The keeping qualities of the fruits were not affected by high or low applications of any of the nutrients tried. 11. A favorable fertilizer treatment caused increases in the sizes of both the smaller and the larger fruits proportionally. 12. Applications of lime to raise the pH values of the soil to approximately 5.0 seemed to favor increased yields of pineapples in both experimental fields. 13. If pineapples are allowed to mature naturally those yielding the largest fruits tend to mature the earliest. 14. Applications of small amounts of magnesium tended to favor increased production in both experimental fields. 15. Gum formation on the fruits was not obviously affected by any of the fertilizer treatments used. 16. Nitrogen and potash applications as used gave significant increases in 11 out of 14 cases above those not receiving these fertilizers."

311. SCHAPPELLE, N. A. 634.774-1.811 + 631.589
The effect of pH and of certain minor elements on the growth of pineapples in water cultures.
J. Agric. Univ. Puerto Rico, 1942, 26: 63-72.
bibl. 2.

This nutritional water culture study of pineapples failed to account for the prevalence of gummosis in many Puerto Rico pineapple fields, but succeeded in demonstrating the effect of some minor elements and of the pH value. It was found that manganese, and to a lesser extent zinc, tended to cause chlorosis, which, on the other hand, could be prevented if aluminium also or, to a lesser extent, boron were added. From this the conclusion is drawn that pineapples require a reduced form of iron and, in general, that it may be the function of minor elements to cause a certain reduction or oxidation of iron in the plant, thus rendering iron more or less functional. Citrus chlorosis and the colour of *Hydrangea* flowers are mentioned in this connexion. The optimum pH value in water culture was determined as 4.4-5. Higher values promoted chlorosis, while lower values were unfavourable to the development of the roots.

312. STEPHENS, S. E. 635.1/7(943)
Vegetable growing in North Queensland. Part 5.
Qd agric. J., 1944, 59: 147-53.

The first three parts of this series dealt with general principles

of vegetable cultivation in tropical N. Queensland. Part 4 discussed the treatments required to succeed with *Brassicae* (*H.A.*, 14: 1931). Part 5 deals with cucumber, marrow, carrot, celery, parsnip, lettuce, tomato, capsicum and egg plant. Carrot, though a cool weather crop, is fairly tolerant of high temperatures and in fact a temperature of 70° F. is necessary to obtain good germination. Continuous low temperatures induce pale-coloured roots. The N. Queensland winter produces a good quality carrot. The most suitable variety is Red-cored Chantenay, a medium long blunt-ended sort. Commercial celery cultivation is restricted to the highland areas during the cooler months, though special treatment, which is not described, enables it to be grown in small quantities in home gardens in the coastal area. Boarding up rather than earthing in is practised for blanching. The latter practice is apt to cause rots. Failing boards, mulch paper set upright and supported by pegs is a good substitute. The varieties grown are Golden Self-blanching and White Plume. Parsnip is fairly accommodating as regards temperature requirements, will grow well in the highlands and has produced large crops on the coast. It is not a popular crop because of its long season of growth. The soil should be neutral in reaction. The variety recommended is Hollow Crown. Lettuce, cabbage type, is grown in spring, autumn and winter and with much success. Summer production requires special precautions against bolting. Main crop varieties for the coastal areas are Imperial 847, Imperial 44 and New York. During the warmer months Mignonette is the only variety with which success can be obtained. In the highlands Iceberg during summer, Imperial 847 in autumn and spring, and New York in winter. Warm days, cool nights and plentiful water are the chief factors for success. Tomato grows well most of the year, provided the variety is selected to suit the district. Some of these sorts have been locally evolved. The remaining plants mentioned are more adapted to these warm climates. Cucumber is susceptible to mildew except for a variety known as Chinese, Japanese or Oriental, which is now largely grown. It has a long dark green fruit and must not be confused with the bitter Chinese cucumber. Capsicum is a strictly tropical crop and will withstand heat that will injure tomatoes. Temperature below 75° F. slows down growth. The variety is Ruling King. Eggplant requires even more heat than the tomato. The market requires round fruit, 4-5 inches in diameter. The variety New York Purple (N.Y. Spineless) is the best. The fruit must be picked at the required size.

313. RIOLANO, A. 635.64: 631.542
The effects of staking and pruning on tomato plants.
J. Agric. Univ. Puerto Rico, 1943, 27: 17-26.

Staking and pruning Marglobe tomato plants did no favourably effect yield, size, quality or earliness of tomatoes in Puerto Rico, but tended rather to decrease total marketable yields, as demonstrated by the results of trials, which were conducted at the Agricultural Experiment Station.

PACKING AND STORING.

314. CHILDS, A. H. B. 631.564: 634 + 635
Collapsible vegetable and fruit crate.

E. Afr. agric. J., 1944, 10: 113-4.
A collapsible vegetable and fruit crate to contain 20 to 22 kilos of tomatoes or oranges, made of *Podocarpus* or other wood, is described and illustrated, its object being to save space on the railways when returned empty.

315. TAYLOR, M. C. 664.85.037 + 664.84.037
The calculation of the cooling load for foodstuffs.
2. Fruits and vegetables.

Food Pres. Quart., 1944, 4: 6-7.
The respiration of fruits and vegetables generates heat, the amount of which is appreciable even at cool-storage temperatures. This must be considered in calculating cooling

loads. Approximate values for the heat of respiration are tabulated for apples, pears, peaches, oranges, Yellow Globe onions and Cobbler potatoes at different temperatures.

316. JENNY, J. 664.85 + 664.85
Die Zugverhältnisse bei der Belüftung von Obst- und Gemüsekellern. (Draught conditions in the ventilation of fruit and vegetable cellars.)
Schweiz. Z. Obst- u. Weinb., 1942, 51: 382-5.

The mechanical principles of cellar ventilation devices are discussed with the help of a diagram.

317. ANON. 664.85.038
New transparent storage material.
Fruitgrower, 1944, 98: 407.

A note on the new transparent packaging material Pliofilm,

to be produced by the Goodyear Tyre & Rubber Co. at Wolverhampton after the war. It is already well known in U.S.A. The note contains the results of many experiments in the use of Pliofilm as a fruit and vegetable wrapper. Fruit so wrapped loses little weight and maintains its freshness and vitamin C content a long time. Its use adds to the appearance of the fruit and it withstands rough handling. It stretches when heated to 350° F. to several times its original area and can thus produce a skin-tight wrap with economy of material. Perfect joining and sealing can be obtained by hot ironing. Pliofilm is now allotted solely for war purposes.

318. DU PLESSIS, S. J., AND REYNEKE, J. 634.872
Packing, handling and transport of table grapes.

Fmg S. Afr., 1943, 18: 439-42.

The problems involved under S. African conditions are discussed. The S. African consumer prefers a well-coloured grape with a high sugar content and, if possible, unusual flavour. There is a practically unlimited demand for the sweet, well-coloured variety, Hanepoot. The optimal method of packing for home market is in unwrapped bunches in 3-inch trays in quantities of 10 to 12 lb. Faulty practices in packing are described. In storage temperature trials the life of grapes removed from low to high temperatures is distinctly shorter than when removed from medium to high temperatures. For inland distribution the most suitable transport temperature was 60° F., and facilities to maintain this temperature on rail are very desirable and should cost less than the cooling of insulated cars to 40° F. by means of ice as is now done.

319. REYNEKE, J., AND DU PLESSIS, S. J. 634.872
The treatment of table grapes for the local markets.

Fmg S. Afr., 1943, 18: 443-5.

Wastage of grapes in local S. African markets is no less severe than during the days of overseas export. The main

causes are (a) dry stalk as a result of which a high percentage of berries fall from the bunch, Waltham Cross variety being very prone to this; (b) rotting, of which *Botrytis* is the chief of several fungal organisms. S. African grapes are very susceptible to damage from sulphur dioxide fumigation, but in certain trials, when fumigated with 0.25% to 0.3% SO₂, they have survived in exceptionally good condition. High temperatures during SO₂ fumigation also materially increase damage. Spraying the packing material at the bottom of the grape box before putting in the grapes with 20 c.c. of a solution containing 20 g. potassium or sodium bisulphite in 100 c.c. water per 10 lb. box (i.e. 1 tablespoonful per box) resulted in the grapes maintaining their freshness and attractiveness in comparison with untreated boxes in which much of the fruit rotted. Berry dropping was also nearly eliminated. Excess application of the solution will damage the fruit. Application can be made by sprinkling from a glass pepper pot, metal being rusted by the compound.

320. NYLUND, R. E. 664.84.13
The storage of carrots in the home.

Minn. Hort., 1944, 72: 115-6.

Experiments carried out on the home storage of carrots by the Division of Horticulture, Minnesota University, indicated that 32°-36° F. was a better storage temperature than 42° F. or 52° F. At the low storage temperature any type of container, such as covered crocks, tins, baskets of damp soil, etc., which will prevent excessive shrivelling, can be used. At 42° F. the carrots may be usefully stored in damp sand or damp soil. If storage at 50° F. is unavoidable the crowns should be cut off and the roots stored as for 42° F.

321. HICKS, E. W. 663.8

(1) Note on the estimation of the effect of diurnal temperature fluctuations on reaction rates in stored foodstuffs and other materials.

J. Coun. sci. industr. Res. Aust., 1944, 17: 111-4.
An engineer's paper.

FOOD VALUES AND PROCESSING.

322. SIDDAPPA, G. S. 634/635: 581, 192: 577.16

Studies on fruit and vegetable products. III. Ascorbic acid (vitamin C) content of some fruits, vegetables and their products.

Ind. J. agric. Sci., 1943, 13: 639-45, bibl. 17.

Most of the data, obtained at the Government Fruit Experiment Station, Quetta, refer to tomato juice. Of the vegetables tested green chilli (*Capiscum acuminata*) and karela (*Momordica charantia*) scored the highest figures for vitamin C content with 74.87 and 188.0 mg./100 g. respectively. The vitamin C content of good Kagzi lime (*Citrus medica acida*) is given as 43.87 mg./100 g. White clingstone peaches were found to contain twice as much vitamin C (11.96 mg./100 g.) as yellow freestone peaches.

323. WOKES, F., AND OTHERS. 634.51: 577.16

Apparent vitamin C as a possible precursor of true vitamin C in walnuts.

Nature, 1944, 154: 669-70, bibl. 10.

Apparent vitamin C present in considerable amounts in unripe walnuts has almost disappeared from the total vitamin C content by the time nut maturity is reached. Apparent vitamin C is the provisional term for substances that so closely resemble true vitamin C in chemical and physical properties that they may be confused when the latter is being estimated by the usual dye titration methods. The identity of apparent vitamin C has not yet been established, but results to date point to apparent vitamin C as a precursor of true vitamin C. Recently it has been shown by West and Zilva (*Biochem. J.*, 1944, 38: 105-8; *H.A.*, 14: 1961) that vitamin C may increase in stored apples and it would be interesting to discover whether these apples contain any apparent vitamin C, and if so, whether the proportions of this decreased as true vitamin C increased.

324. ČAĽACHJAN, M. H. 635.937.34: 577.16

Content of vitamin C in wild roses of Armenia.

C.R. Acad. Sci. U.R.S.S., 1944, 40: 369-71, bibl. 4.

The hips of wild roses in the central highlands of Armenia were found to be particularly rich in vitamin C, those of *Rosa boissieri* containing as much as 3,258 mg. %, while the vitamin C content of the other highland species ranged from 1,000 to 2,000 mg. %. The observation, that as the species move to higher regions with a dry climate the vitamin content shows a sharp increase, is interpreted in the light of phylogenetic considerations. It could further be shown that a relation exists between high vitamin content and certain characters of calyx leaves at the beginning of ripening (fleshy, coloured and turned upwards). While it was thought originally that this correlation, which is very useful from the picker's point of view, is confined to species of the *canina* section, it appears now that it applies more generally to the whole genus.

325. BAUSCH, S. 635.937.34: 577.16

Vitaminengehalt getrockneter Hagebutten. (The vitamin content of dried rose hips.)

Dtsch. Heilpfl., 1944, 9: 54-5, bibl. 3.

Loss of vitamin C in rose hips during the drying process could be reduced to about 15% by observing the following rules: (1) rapid drying, (2) pre-opening of the fruits, (3) avoidance of temperatures above 80-85° C. Instructions are also given for the manufacture of rose hip jam with a high vitamin C content.

326. MCCAY, C. M., PIJOAN, M., AND TAUBKEN, H. R. 635.1/7-1.56: 577.16

Ascorbic acid losses in mincing fresh vegetables.

Science, 1944, 99: 454-5, bibl. 2.

The results are given of studies on the methods of conserving

vitamin C in chopped vegetables, carried out at the National Naval Medical Centre of U.S.A. A table shows the vitamin C contents of a number of kinds of vegetables when freshly chopped, 30 minutes and 2 hours after cutting, when the chopping instruments used were a plastic knife, a steel knife and a mechanical chopper. The vegetables were treated immediately after removal from cold storage. In cases where all three instruments could be compared those cut by plastic knife lost the least. The mechanical cutter invariably caused the highest loss. The loss attributable to the length of time of standing after cutting was considerably more important than that influenced by the type of tool.

327. POLLARD, A., KIESER, M. E., AND STEEDMAN, J. 577.16: 663.3

The ascorbic acid content of some fruit syrups and other products.

J. Soc. chem. Ind. Lond., 1944, 63: 215-8, bibl. 10.

A report of work done at the Long Ashton Research Station. The ascorbic acid content of some fruit syrups, concentrated juices, and spray-dried powders has been determined by the newer methods of analysis involving condensation with formaldehyde for the differentiation of interfering reducing substances. Reductone-like substances have been found to be present in considerable amounts in those products which have been subjected to heat-treatments and adverse storage conditions. In normally prepared fruit syrups the amounts are low during the first year of storage. [Authors' summary.]

328. LAMPITT, L. H., CLAYSON, D. H. F., AND BARNES, E. M. 635.1/7: 577.16

The destruction of ascorbic acid during the cooking of green vegetables. Observations on the mechanism involved.

J. Soc. chem. Ind. Lond., 1944, 63: 193-8, bibl. 13.

No attempt has been made to determine the relative effects on the retention of ascorbic acid in cooked green vegetables of the three recognized mechanisms of ascorbic acid destruction, namely, by direct copper catalysis, by enzymic means, and by heat-stable factors. Clear differentiation could not be obtained and availability of oxygen was found to be a major factor. The discovery that a purely inorganic system comprising alkaline-earth bicarbonates, phosphate, and copper loses its property of decomposing ascorbic acid on being heated to 55° or over suggests that ascorbic acid oxidase may not be an enzyme as generally understood by that term. [Authors' summary.]

329. ALLEN, R. J. L., AND MAPSON, L. W. 664.84.34.047: 577.16

The drying of vegetables II. The loss of ascorbic acid during cooking of fresh and dried cabbage.

J. Soc. chem. Ind. Lond., 1944, 63: 78-83, bibl. 14.

As the result of experiments at the Dunn Nutritional Laboratory, Cambridge, a method of cooking dried cabbage is recommended which best preserves both vitamin C content and culinary quality. The percentage loss of ascorbic acid from dried cabbage during cooking was found to be less than that from fresh cabbage.

330. AUSTIN, C. R. 577.16

The determination of carotene: a critical examination.

J. Coun. sci. industr. Res. Aust., 1944, 17: 115-26, bibl. 11.

A very detailed, critical examination of a method for determining carotene in plant material.

331. WEIER, T. E. 664.84.13.047: 577.16

Carotene degradation in dehydrated carrots. I. Cytological changes in carotene and fat droplets under conditions favourable for carotene degradation.

Amer. J. Bot., 1944, 31: 342-6, bibl. 10.

The effect of various treatments on degradation of carotene in carrot cells is described in detail and shown diagrammatically.

332. BACHARACH, A. L., AND COATES, M. E.

577.16: 634.3 + 635.937.34 + 634.723

The vitamin-P activities of citrus fruits, rose hips, black currants and some fruit products and concentrates.

J. Soc. chem. Ind. Lond., 1944, 63: 198-200.

Oranges and lemons were shown to have a high vitamin P content which was uniformly distributed through peel and juice. Figures of provisional units of vitamin P per 100 g. are also given for rose hips; black currants and their products. There was no correlation between ascorbic acid content and vitamin P potency, the latter being determined by means of biological assays.

333. DILLER. 633.8: 581.192

Die Untersuchung von deutschen Trocken-Gewürzkräutern. (Analyses of dried German spice herbs.)

Dtsch. Heilpfl., 1942, 8: 109-14, bibl. 30.

Detailed tabulated data, with added comment, on the composition of the following spice herbs collected in Germany: *Satureja hortensis*, *Artemisia dracunculus*, *Allium porrum*, *Origanum majorana*, *Petroselinum sativum*, *Apium graveolens*, *Thymus vulgaris* and *Allium cepa*.

334. BURGER, I. J. 664.85.047

Drying of fruit.

Fmg S. Afr., 1943, 18: 478-80.

A brief summary of methods used in drying fruit in S. Africa with notes on the differences in treatment required by the various kinds of fruit.

335. BOUILLOUD, M. 664.85.047 + 664.84.047

Le séchage industriel des fruits et des légumes en Algérie. (Commercial drying of fruits and vegetables in Algeria.)

Concours de Fruits et Légumes séchés et de Conserves de Fruits d'Algérie, Nov. 1941, 1942, pp. 44, and *Annexe à la Conférence E*, pp. 15 [being the illustrations].

The bulletin is written in order to help those considering the commercial production of dried fruits in Algeria. The various methods possible are briefly reviewed, the buildings and apparatus required for the establishment of a drying plant and for a pulping plant, the labour and time required for the various operations, and the methods used in drying apricots, raisins and prunes are discussed. The results of experiments in drying vegetables in an air tunnel are given. Sun drying should be used as accessory to mechanical drying. It would rarely be successful on a commercial scale by itself. The illustrations accompanying the paper are bound up separately.

336. PERONNE, —. 664.84.047

Le séchage familial des légumes frais. (Domestic vegetable drying.)

Bull. Inspect. gén. Agric., algér., 67, 1942, pp. 8.

Under Algerian conditions vegetables after steeping for 2 to 10 minutes in boiling water, or at about 100° C., but not long enough to cook them, can be satisfactorily air-dried on lattice or wicker work trays. The trays holding the vegetables, though placed in the sun, are covered by a similar tray as a protection against flies and are thus actually in half shade. They take longer to dry thus but the quality is better. A certain amount of attention is needed during drying, the details of which are described; for instance the drying product should be taken indoors at night and turned occasionally, this operation being simply accomplished by reversing the tray and its lid. Vegetables so treated can be kept for 2 years inland and 1 year on the coast. Separate instructions are given for drying haricots verts, mange-tout and immature shelled peas, carrots, turnips, sweet potato, cabbage hearts, cauliflowers, aubergine, pimiento and tomato.

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337. MAURI, N. 664.85.047 + 664.84.047
 La déshydratation industrielle des fruits et légumes en Algérie. (Commercial dehydration of fruits and vegetables in Algeria.)
Bull. Inspect. gén. Agric. algér. 94, 1943, pp. 36, bibl. 4.

Apparently a number of Algerian business men have recently undertaken the commercial drying of fruits and vegetables without the benefit of competent technical advice and therefore with results not always happy. The bulletin is intended to supply this want and it treats of installations and methods very thoroughly. The essential processes in the treatment of each of the principal fruits and vegetables susceptible to drying is described.

338. ANON. 664.85.047
 Le séchage familial des fruits. (Domestic fruit drying in Algeria.)
Bull. Dir. Agric., algér. 102, 1944, pp. 4.

Deals with the sun-drying of fruit for family use in Algeria. The subject is treated in a general way, individual fruits not being mentioned.

339. ANDRISKE, A. 664.85.21.047
 Drying apricots in the non-irrigated areas.
J. Dep. Agric. S. Aust., 1944, 47: 562-4.

A description of sun drying of apricots, including picking, sulphuring and drying whole fruits.

340. PYKE, W. E., AND CHARKEY, L. W. 664.8.047
 Making and using a food dehydrator.
Bull. Colo. agric. Exp. Stat. 477, 1943, pp. 11.

Suggests and illustrates simple methods of constructing a home-made food dehydrator. The principle is to blow heated air by means of a fan into the drying chamber. The air is heated in any convenient manner in an oven forming an antechamber to the food box; the fan, installed in the oven is, for preference, electrically controlled. A thermostat is useful but not necessary. A brief exposition on dehydration and storage is given. The users of this apparatus will probably have to learn by their mistakes.

341. CRUESS, W. V., AND SMITH, M. 664.84.047
 Decrease in enzyme reactions in dried vegetables during storage.
Fruit Prod. J., 1944, 24: 17, 27.

With certain vegetables, the peroxidase reaction present in recently dried, insufficiently blanched, dried vegetables tends to decrease in storage and often disappears: hence, may become an unreliable test for adequacy of blanching in such cases. The catalase reaction, while destroyed at a much lower temperature than the peroxidase reaction, is more persistent in the stored dried products. In beets and rutabagas the usual colorimetric tests for peroxidase are meaningless. [Authors' summary.]

342. CALDWELL, J. S. 635.13: 664.84.13.047
 Comparative suitability for dehydration in thirty varieties and strains of orange-fleshed carrots.
Fruit Prod. J., 1944, 24: 7-16, 27, bibl. 24.

Of thirty carefully tested carrot varieties the following were classed in the category of "highest excellency" in respect of their suitability for dehydration: Amsterdam Forcing, California Bunching, Goldinhart, Imperator (two strains), Improved Chantenay, Morse Bunching, Nantes, Nantes Half Long, Oregon Chantenay, Oxheart (Holmes), Perfection, Tendersweet (Holmes) and Touchon. Yields of the dry product, averaging 7.5-8.5% of the fresh material, were found to be determined by peeling and trimming losses rather than by the content of total solids. Preservation of colour and retention of carotene were improved by a dip in SO_2 solution prior to blanching. The best storage temperature for carotene retention was 50° F. Determinations of ascorbic acid losses were also made and the methods of preparation and drying are described in detail.

343. HOHL, L. A., AND SMITH, M. G. 664.84.64.047
 Observations on powdered dehydrated tomatoes.
Fruit Prod. J., 1944, 24: 18-20, bibl. 3.

It appeared desirable to experiment on the production of a dehydrated tomato powder in view of the poor reconstitution of dehydrated tomato slices and of the poor quality of existing powders. The results showed that a satisfactory product can be obtained by means of SO_2 treatment before dehydration, which improves appearance and palatability and retards the oxidative destruction of carotene and ascorbic acid. The best storage conditions for the powder were vacuum packing and room temperatures. The preparation of the powder from dehydrated tomatoes and some experiments on drum drying of tomato purée are described.

344. BOVINGDON, H. H. S., AND COYNE, F. P. 634.873.4: 632.944
 Trichloracetonitrile as a fumigant.
Ann. appl. Biol., 1944, 31: 255-9.

After having demonstrated the efficacy of trichloracetonitrile as a fumigant of grain it is shown that dried fruits also may be treated successfully with this chemical. Boxes of currants naturally infested with *Oryzaephilus (Silvanus) surinamensis* served as the test object in trials conducted at Jealott's Hill Research Station, Berks. The concentrations used were 60 and 48 mg./l. for 24 and 48 hours respectively and were nearly 100% effective.

345. TURNER, C. 663.3
 Some notes on country cider-making.
J. roy. hort. Soc., 1944, 69: 336-7.

The method of cider making carried out on small farms is described. A list is given of the best cider apples, two of the most used (by Messrs. Whiteway, Devon) being Sweet Alford and Maid of Devon. All kinds of apples, however, are suitable for the purpose, including ill-shaped or damaged fruit and even "those of a rotted brown colour". Apples intended for cider are stored before use in heaps on the ground; they must not be boxed or bagged or they will rot. A photograph is given of a hand-operated machine practically complete in every detail and the use of the various appliances shown is explained. The apples are first put through a hand-turned grinder, the resulting pulp being scooped out with a wooden shovel from a tray beneath and conveyed to the press, which is screwed down by hand. The juice is carried away in wooden, not zinc, buckets and run into a barrel through a funnel or tun-dish. Fermentation soon begins and is complete in about 9 days, the frothy matter emerging through the bung-hole. The hole is now lightly corked, being eased occasionally to allow gas to escape before the final sealing, after which the cider remains till used. Sweetening, if required, is done with sugar, candy, or in wartime with saccharin dissolved in warm water. Should the cider be required in clear condition it is obtained by racking or drawing off the cider with a siphon or small pump in such a way as not to disturb the settling at the bottom and top of the cork. The only preservative allowed is sulphur dioxide at a certain strength.

346. WIDMER, A. 663.2
 Ueber die Herstellung von Tresterwein ohne Zucker. (The production of wine from grape residues without sugar.)
Schweiz. Z. Obst-u. Weinb., 1941, 50: 424-9.

By adding apple juice instead of sugar to the juice of pressed grape residue a reasonable quality of wine can be produced, which is a refreshing home drink, though of low alcohol content.

347. SCHELLENBERG, H. 634.8-1.542
 Ursachen der grossen Differenzen in den Mostgewichten gleicher Lagen. (Causes of the difference in must shown by wines of the same origin.)
Schweiz. Z. Obst-u. Weinb., 1943, 52: 284-5.

The large differences in wine quality, frequently amounting

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to 10° Oechsle, between wines from the same locality, are thought to be due to a difference in pruning methods. An increase in quantity due to long pruning is obtained only at the cost of quality, which indicates the desirability of more severe pruning aiming at vigorous vines. The idea that the grapes should be exposed to the sun is also wrong. Insufficient foliage is another cause of quality deterioration.

348. JENNY, J. 663.813
Wieviel Kohlensäure nehmen alkoholfreie Fruchtsäfte auf? (How much carbon dioxide is absorbed by fruit juices?)

Schweiz. Z. Obst-u. Weinb., 1941, **50**: 353-5.

The figures presented, obtained in experiments at Wädenswil, show that the absorptive capacity for CO_2 and the CO_2 pressure in apple and pear juices are largely determined by temperature and the degree of clarification.

349. LYNCH, L. J. 663.813: 634.3
A new charter for the citrus juice industry.
Food Pres. Quart., 1944, **4**: 15-6.

The hope is expressed that the newly-established citrus juice industry in Australia will be carried over into the post-war period. Suggestions are made for the control of some widespread teething troubles, such as the presence of small quantities of rind oil and air in the processed juice.

350. MANGAT, S. S. S. 663.813: 634.3
Use of mango pulp as source of colour in citrus squashes.

Punjab Fruit J., 1944, **8**: 72.

An addition of 10% mango pulp to citrus squashes as a source of colour instead of dyes proved very satisfactory at Lyallpur. While the mango flavour becomes imperceptible after about 4 months, the colour is fully retained. The mango pulp was prepared during the previous summer and stored either with 0.1% potassium meta bisulphite or after pasteurization. It is noted that this procedure not only saves the cost of the dye but adds to the squash also a small amount of carotene which is lacking in citrus juices.

351. SINGH, L., AND LAL, G. 663.813: 635.64
Studies in the preservation of fruit juices. III.
Preparation and preservation of tomato juice.
Ind. J. agric. Sci., 1944, **14**: 89-95, bibl. 28.

These are the chief results obtained in experiments on the preparation and preservation of tomato juice under Indian conditions: (1) The small red fruits of the Peshawari variety gave a product of better quality than the large-sized fruits of the Desi variety. (2) Fully ripe, red-coloured juicy tomatoes should be chosen and thoroughly washed and trimmed. (3) The blanching of whole tomatoes proved inferior to crushing and chopping of the fruits prior to juice extraction. (4) The desirable quantity of soluble solids in the juice, which was greatly improved by the addition of 1% cane sugar, was found to be 6%. (5) The best method of preservation was pasteurization plus 0.02-0.05% sodium benzoate. (6) Adverse colour changes in the juice stored in glass bottles are believed to be due to varying amounts of oxygen incorporated during the process of manufacture. There was hardly any colour change in canned juice, the oxygen present being fixed by the tin plate. (7) Unless special equipment is used to prevent the incorporation of air during the entire process of manufacture, considerable loss of vitamin C appears unavoidable, while the carotene content remains stable with ordinary equipment. Finally, general recommendations based on trials are given for the manufacture of tomato juice, both on a domestic and a commercial scale, and the cost of production is worked out.

352. SIDDAPPA, G. S., AND MUSTAFA, A. M. 664.84-65.036
Canning of tomatoes in Baluchistan.

Misc. Bull. imp. Coun. agric. Res. India **58**, 1944, pp. 5, bibl. 4.

Precise details are given of the technique involved in canning tomatoes with notes of costs.

353. PYKE, W. E., AND BINKLEY, A. M. 664.84.037+664.85.037
Freezing vegetables and fruits.

Bull. Colo. agric. Exp. Stat. **478**, 1943, pp. 16.

Instructions for the preparation for freezing of vegetables and fruits. A table is provided showing individually for a number of these products the correct state of maturity, condition, quality, method of handling, preliminary treatment (washing, cutting, etc.), type and time of blanching and any special instructions. How the freezing is to be accomplished is not stated, but presumably at a commercial freezing plant.

354. ANDERSON, G. W. 633.682-1.56
Notes on cassava preparation in North Kavirondo and Samia.

E. Afr. agric. J., 1944, **10**: 111-2.

Some early to medium early "sweet" cassava varieties, which are most popular in the Samia and North Kavirondo areas of East Africa, are briefly characterized. Several methods of preparation according to local taste are described.

355. GRIBBINS, M. F., HALEY, D. E., AND REID, J. J. 633.71-1.56

The fermentation of cigar-leaf tobacco as influenced by the addition of yeast.

J. agric. Res., 1944, **69**: 373-81, bibl. 13.

The results of fermentation studies dealing with the application of bakers' yeast to Pennsylvania cigar-leaf tobacco of the 1940 and 1941 crop are presented. The following conclusions seem justified: (1) Initial temperature gains were greater with all yeast-treated tobacco under the conditions of these experiments. (2) The addition of yeast stimulated the development of organisms considered necessary to the fermentation process. (3) A more rapid initial fermentation was evidenced in the case of the yeast-treated samples. [Authors' summary.]

356. PAVLOVSKI, E. N. 633.85: 578.6
The use of oil from *Juniperus turcomanica* B.
Festsch. in microscopy. [Russian.]
Priroda [Nature], 1943, No. 4, p. 90.

An oil has been extracted from the berries and foliage of *Juniperus turcomanica*, and one sample of it was in a perfect state of preservation after 10 years. The results of analysis of oil from the berries are given in detail. In its characteristics the oil resembles that of *J. polycarpus* C. Coch. and of *J. excelsa* MB. The composition of the latter has been found to differ completely from that of the usual juniper oil, and to resemble, rather, that of the Virginia juniper or "cedar oil". The yield of oil, by the steam distillation of other samples of berries, amounted to 1.5% by weight. The oil has a very agreeable smell, a pleasing amber colour and a viscous consistency. It is easily soluble in 96% ethyl alcohol, and when used for clarifying objects for microscopic examination it enables absolute alcohol and xylol to be dispensed with.

357. BALDWIN, —. 634.21: 633.85
Report on apricot-kernel oils.

Bull. imp. Inst. Lond., 1944, **42**: 153-60, bibl. 6.

The preparation both of expressed and volatile apricot-kernel oil and their properties and uses are described. Figures are given for the material available in Australia.

358. SCHÄR, A. 634.8: 633.85
Die Oelgewinnung aus Traubenkernen. (Oil production from grape stones.)

Schweiz. Z. Obst-u. Weinb., 1941, **50**: 440-7.

PEYER, E.

Traubenentkernung und Oelgewinnung aus Traubenkernen der Ernte 1942. (Grape stone removal and oil production therefrom in Switzerland, autumn 1942.)

Schweiz. Z. Obst-u. Weinb., 1942, **51**: 380-1.

Oil production from grape seed has become a necessity in Switzerland and several aspects of the problem (legal,

yield expectations, organization) as it presented itself in autumn 1941 are dealt with. The extraction of 100 tons of oil (30,000 kg. table oil and 70,000 kg. industrial oil) from 1,500 tons of grape seed of the 1941 harvest tends to show that an organized effort in Switzerland would yield remarkable results.

359. HENRY, A. J., AND GRINDLEY, D. N. 633.85
The oils of the seeds of *Ocimum kilimandscharicum*, *Euphorbia calycina*, *E. erythraeae*, *Sterculia tomentosa* and *Trichilia emetica*.
J. Soc. chem. Ind. Lond., 1944, 63: 188-90, bibl. 9.

A survey of the oil-bearing seeds of Sudan showed that the oils of the first 3 plants are suitable substitutes for inseed oils in paints and the oils of *Trichilia emetica* are excellent for soap-making.

360. NÁDKARNI, M. D., AIRAN, J. W., AND SHAH, S. V. 633.85
Fatty oil from the seeds of *Mappia foetida* (*Olacaceae*).
Curr. Sci., 1944, 13: 233.

The physical and chemical constants are given.

361. CHILD, R. 634.61-1.56
(2) Coconut shells as an industrial raw material. IV. Coconut shell charcoal: (A) Commercial.
Curr. Sci., 1944, 13: 245-50, bibl. 25.
For previous articles in this series see *ibidem*, 1943, 12: 292-4; 1944, 13: 4-6 and 150-2.
HUMPHRIES, E. C. 633.74: 581.192
Studies on tannin compounds. I. Changes during autolysis of minced cacao bean.
Biochem. J., 1944, 38: 182-7, bibl. 13.

NOTES ON BOOKS AND REPORTS.*

362. CHESTER, K. STARR.

632.1 + 632.3 + 632.4 + 632.8

The nature and prevention of plant diseases.
The Blakiston Company, Philadelphia, 1942,
pp. xii + 584, frontispiece + 207 figs., bibl. to
chapters, \$4.50.

This book, written for American agricultural students, should prove for them a source of valuable information on the recognition and control of diseases of crop plants. The causal organisms are but briefly described and emphasis is given to descriptions of disease symptoms, losses incurred, range of hosts, and control measures. The diseases described are such as are encountered in the United States, but as so many of them have an almost world-wide distribution there is information that will be useful to students in other countries. Moreover the possibility that some of the diseases at present confined to the New World may invade other regions must be borne in mind, for to obtain knowledge of important diseases that have not yet entered one's own country is to be forewarned; certain destructive parasites have in the past crossed the Atlantic and others may well do so in the future, especially as intercommunication between countries is becoming more and more easy. In this connexion it is to be noted, for example, that the Texas root rot fungus, at present confined to the southern States, "attacks more species of plants than any other known pathogen, more than 1,700 species", including a number of fruit, field and vegetable plants grown in the Old World (pp. 168-9). Again cherry leaf spot (caused by the fungus *Coccomyces hemicallis*), "the most frequent and destructive foliage disease of all common varieties of cherry" (p. 143), has not yet been recorded in Europe. A "selection of major diseases of leading crops" has been made, and many diseases are, of necessity, omitted; of these the reviewer was disappointed to find no mention of bacterial blight of cherries caused by *Pseudomonas cerasi* (though leaf spot of stone-fruit trees caused by *Bacterium pruni* is described), a disease comparable with bacterial canker of stone fruit in Europe, and perennial apple canker, a disease fairly common in America but only recently found in England. The latest information about such diseases in America would be of value to students in Britain. Under "Physiogenic diseases" (chapter 14) the general symptoms of a number of "deficiency diseases" are given, but there is no reference to the more exact injection and spectrographic methods of diagnosis advocated in recent years. The emphasis thrown on control measures is shown by the last three chapters in which are described "Principles and procedures in the control of plant diseases; control of plant disease by regulation", "Control of plant disease by inducing resistance", and "Control of plant diseases by cultural methods". Agricultural and horticultural students (undergraduates, graduates and post-graduates) will find this

book most stimulating, while advisory officers for plant diseases will obtain from it much useful information that is not readily available elsewhere. H.W.

363. LAURIE, A., AND KIPLINGER, D. C.

635.9: 631.544

Commercial flower forcing. The fundamentals and their practical application to the culture of greenhouse crops.

The Blakiston Company, Philadelphia, 4th edit., 1944, pp. 598, bibl., \$4.50.

The 2nd edition of this book (1939) was reviewed in *H.A.*, 1940, 10: 1260, when a synopsis of the contents was given. A 4th edition has become necessary in order to keep pace with the rapid progress of the last 2 years. The present volume incorporates the most recent advances in knowledge of soil sterilization, temperature control, the importance of humidity, the simplification of the use of growth promoting substances, newer measures of pest control and other matters of lesser importance. Changes and amplifications have been made in the chapters dealing with plant growth, soils and fertilizers, and propagation, and the directions for attaining cultural perfection with many crops have been almost completely revised. The discussion on production costs has not been altered since the present increase of 50% on the estimates arrived at in the previous editions are, optimistically perhaps, considered to be temporary. Although the book has been written for America, the basic principles laid down will apply everywhere and the information on glasshouse management can be easily modified to suit any temperate climate. This is an essential book for the commercial flower grower, and the keen amateur, too, will find it absorbing. The possession of an earlier edition should encourage rather than preclude the purchase of the current issue, for the advances recorded are likely to prove of financial no less than of scientific importance. In one matter of some moment no advance has, strangely for these times, been recorded. We refer to the price, which remains as before, and for this the publishers are to be commended. The binding and excellent paper also remain unchanged, and they and the ample margins and well-spaced headings are pleasant to English eyes accustomed to wartime productions.

364. BRITISH MYCOLOGICAL SOCIETY, PLANT PATHOLOGY COMMITTEE 014: 632.3/4 + 632.8 + 632.1
List of common British plant diseases.

Cambridge University Press, London, 1944, pp. 61, 5s., being the 3rd edition of the *List of common names of British plant diseases*.

For a brief appreciation of the 2nd edition see *H.A.*, 5: 516. In the 3rd edition the list is rearranged in alphabetical order according to host names and is revised and enlarged. A preliminary list of tree diseases has also been incorporated.

* See also 276.

365. GRÜNBERG, I. P. 634.25 +634.22(82)
Variiedades de duraznos y ciruelos que se cultivan en el país. (Peach and plum varieties of Argentina.)
 Facultad de Agronomía y Veterinaria, Buenos Aires, 1944, pp. 453, being Tome VI of the Biblioteca agronomía y veterinaria.

This book is issued by the Faculty of Agriculture of Argentina as an aid to the recognition of the numerous peaches and plums cultivated in that country. The greater part is taken up with a detailed and illustrated description of each variety. A few of the plates are in colour. The bibliography which heads each varietal description shows that few varieties have not already been described in English and figured in colour by Hedrick in his Peaches or in his Plums of New York. The opening chapter stresses the need for the reorganization of the Argentine Fruit Industry, which suffers now from haphazard methods, leading to unnecessary gluts, the propagation of unsuitable varieties, bad marketing and other undesirable features. Experiment is needed before much can be done. Some urgent needs are: varieties that will grow in temperate climates and will mature in the north of the country in September and October, varieties that are resistant to the pests and diseases of the littoral provinces, varieties that will stand up to transport and refrigeration and the propagation of varieties commercially acceptable. A key is provided in which the small distinctive varietal differences are well set out. No two peach or plum varieties are exactly alike and this key, if studied attentively in conjunction with the full description, should ensure identification in most cases.

366. REBOUR, H. 634.1/8(611)
Manuel du planter. (Fruitgrowers' manual for Tunisia.)
 Direction des Affaires économiques de Tunis, 2nd edit., 1938, pp. 312.

This manual deals fully and scientifically with fruit growing under Tunisian conditions. There is an interesting chapter on rootstocks suited to local conditions.

367. JAMESON, D. H., AND SCHMIDT, C. M. 546.27: 016
Boron as a plant nutrient. A bibliography of literature published and reviewed. Supplements II and III for 1939 and 1940 (mimeographed). American Potash Institute Inc., Washington, D.C., 1940, pp. 81+index xvii and 1941, pp. 68+index xvi.

The original bibliography was published in September 1938 and the first supplement in 1939 (H.A., 10: 35).

368. ASHANTI. 551.566.1(667.4)
Annual report of Ashanti Department of Agriculture 1943-44, 1944, pp. 28 (mimeographed).

Owing to food and rubber production drives and shortage of staff, research has practically ceased. The report is interesting as showing the difficulties with which the agricultural officers are expected to contend.

369. COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, AUSTRALIA. 634/635(94) +664.84 +664.85
Seventeenth Annual Report of the C.S.I.R. Aust. for year ended 30th June 1943, 1944, pp. 76, 3s. 4d.

Plant Investigations. *Fruit.* At Huonville, Tasmania, investigations on storage disorders have been reduced in favour of problems more closely related to war. Borax soil dressings have practically eliminated internal cork in Tasmanian apples. The causes of cork of pears and dimple of certain apples are still undetermined. Surface coating resulted in successful cool storage of apples for more than 9 months. Experiments are in progress on a rotary-louvre drier for apples and potatoes and on different methods of sulphuring evaporated apples. At Stanthorpe, Qd, the only apple which develops a strong, even root system grown on its own roots is Delicious. A series of pear rootstocks

has so far yielded one promising stock, which appears to be compatible with Williams. At Griffith, citrus rootstock work continues. Great differences in vigour and growth of the various types are already apparent. Since *Poncirus trifoliata* is practically resistant to *Phytophthora citrophthora*, selection is being made of trifoliate types which produce vigorous growth in the scion. Notes are made of the root growth at different seasons of sweet orange, sour orange and trifoliate. The inarching experiments described in previous reports, 1939-40 and 1940-41, have failed to show any effect of treatment. *Drug plants.* Work is in progress on the growth and/or extraction of the following among others:—hyoscine and atropine from *Duboisia* sp., *Hyoscyamus niger* and *Atropa belladonna*; opium alkaloids from poppy; ephedrine from *Ephedra* spp.; quinine from *Cinchona* (1,000 trees just over 2 years old in one place); emetine from *Caephepis ipecacuanha*; santonin from *Artemesia*. Selection of pyrethrum continues at Canberra. *Tobacco.* Work on the virus vector jassid *Thamnotettix argentata* continues. *Fibre plants.* Problems of flax are being investigated. There appears little prospect of economic development of *Urena lobata* as a jute substitute. *Vegetables.* Work is in progress on various vegetable problems including spotted wilt of tomatoes, tomato seed extraction, slimy heart in lettuce seed crops, pea and bean mosaic and varieties, new vegetables including lettuce, comparable quality of Australian and foreign produced vegetable seed. *Rubber plants.* Plants under investigation include *Cryptostegia*, guayule, kok saghyz and tau saghyz. Entomological Work. A number of parasites and the promise they offer of controlling St. John's wort and lantana are under investigation. Work is in progress on *Cydia molesta*, *Gnorimoschema (Phthorimaea operculella)*, *Pieris rapae*, *negara viridula*, various aphids, *Aonidiella auranti*, *Saissetia oleae*, among other pests.

Irrigation Settlement Work. Commonwealth Research Station, Merbein. Investigations concern vine growing, production of vegetables and drug plants and fruit processing problems such as the substitution of Australian cotton seed oil for olive oil and of vine ash extracts for commercial potash fertilizers, as well as dehydration of pears and clingstone peaches. Irrigation Research Station, Griffith. Investigations are reported on orchard cover crops, irrigation of vegetables, vegetable seed production, weed control, carrot and cabbage fertilizers, general irrigation problems.

Food Preservation. Work includes investigations on fruit and vegetables, canning, dehydration and storage of dehydrated vegetables, fruit storage, especially oil dips for fruit and vegetables, drying of fruits, fruit juice preparation, especially those of apple and orange. Staff. The report ends with a list of C.S.I.R. technical staff and of publications issued during the year under review.

370. BERMUDA. 634 +635(729.9)
Report of the Department of Agriculture for the year 1943, 1944, pp. 10.

The establishment of a vegetable marketing centre has proved a useful means of bringing about a much-needed contact between grower and buyer in Bermuda. The government were able to assist farmers by buying their potatoes as soon as lifted and so relieving them of the necessity of storage during the hot weather. Potatoes stored in bins in a forced draught of air gave good results, but carrots and cabbage dried up rapidly. A campaign for increased fruit production, especially citrus, was started, with the idea that every garden should contain a few trees. This would greatly improve the supply of fruit in the island at small cost to the grower. Trees were imported from Florida. An attempt to produce seed of the cauliflower, Early Market, was only partially successful owing to the fact that seeding coincided with an exceptionally rainy period. The seed saved germinated well and in normal conditions a local-grown supply might be maintained. Various insect

and fungus pests were investigated and a number of new records of fungus were made. Among new varieties of fruit introduced for trial were bisexual varieties of papaw.

71. CANADA, MINISTER OF AGRICULTURE, 06: 63(71)
Directory of organization and activities of the Dominion Department of Agriculture, Canada
 (revised Jan. 1944), 1944, pp. 36.

This publication should be most useful to those both in and out of Canada who want information on specific points but do not know to whom to apply. The different branches of the Department and the posts in them are listed. Those of the greatest interest to horticulture will be found under the following headings:—*Science Service*. This contains the Division of Botany and Plant Pathology with headquarters at Ottawa and numerous laboratories in the Provinces, the Division of Chemistry, the Division of Entomology and, finally, the Plant Protection Division which is responsible for the enforcement of regulations with regard to quarantine of imports and exports. *Experimental Farm Service*. This includes the Horticulture Division with a technical staff of 13 at Ottawa, the Tobacco Division and Branch Farms and Stations throughout the Provinces, a large number of these having a horticulturist on the staff. *Marketing Service*. This contains a Fruit and Vegetable Division which administers regulations under the Fruit, Vegetables and Honey Act and those governing the canning of fruit and vegetables. Adjustments in the work of the above Services due to the war are noted.

72. CAWTHON INSTITUTE. 633/634(931)
Annual Report of the Cawthon Institute, Nelson, 1943-4, 1944, pp. 35.

Fruit investigations. Magnesium carbonate and ground dolomite rock have given more satisfactory control of magnesium deficiency in apple than magnesium sulphate. Micro-chemical methods have been devised for determining the magnesium and potassium in leaves. In Mg-deficient trees the 5 lower leaves on the leader were found to contain less than one-half the magnesium of the 5 top leaves of the same leader. In healthy trees the differences were very much less marked. Trials in 1942/43 showed that the Sturmer apple is particularly rich in vitamin C with up to 36 mg. per 100 g. fresh fruit. It is noticeable in later trials, not yet complete, that Cox's Orange shows a very low content, viz. 6-8 mg. Excellent juice concentrates have been produced from Sturmer and Lord Wolseley apples. On apple fertilizer plots at Moutere the best growth was shown on those which had received a complete NPK fertilizer for many years. The poorest plots were those which had received N only or no manure. Double Vigour (French Crab seedling) rootstocks are proving increasingly superior to Northern Spy stocks for the variety Statesman. Work continues on the 3 codling moth parasites *Ephialtes caudatus*, *Aenoploxy carpopcaeae* and *Cryptus sexannulatus*. *Tomato work*. The following problems have been under investigation:—steam sterilization of soil, soil disinfectants, hard core, cloud, stem borer. *Tobacco Research*. This has included soil surveys, nutrition, curing, Mg deficiency, tobacco wastes, nicotine recovery, various diseases including mosaic and the factors affecting its incidence. *Entomology*. The entomologists are examining the possibility of controlling St. John's wort by the introduction from Australia of *Chrysomela hyperici*. Some 30,000 of these beetles have been received by the Cawthon Institute and later liberated. A fair measure of control is also being achieved over the diamond-back moth (*Plutella maculipennis*) by the use of the parasites *Angitia cerophaaga* and *Diadromus collaris*.

73. CHESHUNT. 635.1/7: 631.544

29th Annual Report of the Cheshunt Experimental and Research Station, 1943, 1944, pp. 78.

Some results of experiments obtained in 1943 recorded in his report are as follows. *Manurial, etc.* (The Director.) (a) After 4 years application on the same soil, yield between tomatoes receiving muriate and those receiving sulphate

of potash was about equal. (b) Chopped straw at 12 tons per acre applied to glasshouse sterilized soil which had grown tomatoes for 30 years checked growth and caused hardening. The conditions were corrected by 2 applications of sulphate of ammonia or dried blood at the rate of 1 oz. per sq. yd. Yields were slightly lower than from controls receiving sulphate of potash only. Horse manure, 30 tons per acre and/or a complete base fertilizer applied either before or after steaming were equally without effect. (c) In another trial composted tomato green leaves and shoots at 15 tons per acre were slightly less effective than horse manure at the same rate, yields being 54.37 and 57.08 tons per acre respectively. (d) It was possible to lower the pH of the soil by adding flowers of sulphur 2 oz. or 4 oz. per sq. yd. or dilute sulphuric acid equivalent to 2 oz. flowers of sulphur per sq. yd., but this did not affect the tomato crop, possibly because of its wide range of tolerance. (e) Number and arrangement trials in cucumber houses resulted in favour of 3 rows of tomato plants on either side of the central path, the 4 middle rows of the house being removed after the crop from 4 or 5 trusses had been picked. Much increased yields were obtained when 32 in. pots were stood on the border in front of a single row planted naturally and stopped at the second truss. Being closer together, their yield equalled 4 trusses per plant on the normal number of plants. *Variety and planting trials*. Highest yields of glasshouse tomatoes came from Manx Marvel, which, however, is one of the latest to ripen. Ideal, Potentate and Bide's Recruit were all in the over 70 tons per acre class. A report is given on some imported varieties of outdoor tomatoes. Reputed frost-resistant varieties proved not to be so but to be slightly more resistant to strong winds and low temperatures at planting. The best outdoor commercial planting method is in double rows, 3 feet apart, 18 in. between the two rows and plants 18 in. apart in the rows, single stems. *Mycologist's Report*. (P. H. Williams.) The differential effects produced in 1942 by *Verticillium albo-atrum* and *V. dahliae* were not confirmed. Tomato-rot caused by *Didymella lycopersici* was observed (E. Sheard) and experiments on its control by chemical means were started and are described (W. H. Read). A new type of tomato stem rot caused by *Phytophthora parasitica* is described (Williams and Sheard). It differs from that caused by *D. lycopersici* by the folding of the tissues, the fact that the epidermis remains firm and is more resistant to scraping and by the absence of pycnidia (see also *Gdnrs' Chron.*, 1943, 114: 96-7; *H.A.*, 13: 1438). Development of tomato plants attacked by spotted wilt virus is traced (J. W. Selman). In plants affected by both spotted leaf and tomato mosaic virus the effect of the former tends to disappear in the fruit. Tomato mosaic plants often yield a heavy crop unlike those struck by spotted wilt. The interrelation between mosaic infection, soil conditions and blotchy ripening was studied (Selman). Blotchy ripening was influenced by the type of growth associated with the water-retaining properties of a particular soil mixture, the best results being with a soil-stable manure mixture for pot work. Steaming, the addition of peat or conditions leading to extreme fluctuations in water content all produce blotchy ripening. *Entomologist's Report*. (E. R. Speyer.) Experimental work on red spider (*Tetranychus telarius*), wireworm and the root-knot eelworm (*Heterodera marionii*) were undertaken. *Chemist's Report*. (O. Owen.) In this report the chemical aspects of the experiments mentioned in the Director's section (above) are discussed. The report contains an appendix showing publications by officers of the station since 1919.

74. COLORADO. 634/635(788)

Fifty-fifth Annual Report of the Colorado Agricultural Experiment Station, 1 July 1941 to 30 June 1942, 1942, pp. 59.

The report covers every aspect of agriculture but deals only briefly with horticulture. Among the horticultural results obtained were those with sour cherry manuring recorded in abstract 39 of this issue, and the following. Chlorosis of

stone fruit was reduced by all sulphur treatments and unaffected by mulch treatments. Winter injury to raspberry was unaffected by fertilizers or irrigation. Ammonium sulphate used alone improved foliage colour of raspberries. Hail-bruised sour cherries gave a useful juice product. The firmness of the flesh of canned fruit may be increased by 11% by the addition of small quantities of calcium chloride to the syrup (maximum 0.20%). Hard green peaches giving 15 lb. pressure test could be stored and shade-ripened for 1 week to develop sugar content and acidity equal to tree-ripe peaches, provided refrigeration were omitted. A new virus of peach characterized by narrow irregular leaf blades, severe cracking of bark and death of small twigs was found to be infectious. Golden net, another new peach disease, was found to be caused by an infectious virus. A new infectious virus disease of cherry was discovered and named raspleaf. A chemical test for the detection of mosaic-infected peach holds promise. Five pages of bibliography relate to staff contributions during the report year.

375. COLORADO.

635.1/7(788)

Fifty-sixth Annual Report of the Colorado Agricultural Experiment Station, 1 July 1942 to 30 June 1943, 1943, pp. 40.

In the horticultural section, which is only briefly dealt with, studies on potatoes took chief place. No effect of 3 different levels of phosphate on the vitamin A, B and C values of Landreth tomatoes could be detected. Porter tomato seemed resistant to fruit rot as did some other imported sorts. The optimum temperature for infection lies between 27° and 30° C. The causal fungus is *Phytophthora capsici*. A non-segregating, thrips-resistant type of Danvers onion is probably shortly to be evolved. Definite responses to 15 lb. treble superphosphate per tree were obtained on phosphate-deficient pear trees. Similar responses were obtained by the use of sulphur, presumably because it released sulphur to the trees.

376. GOLD COAST, EASTERN PROVINCE. 633/634(667)

Annual Report of the Eastern Province, Gold Coast 1943-44, 1944, pp. 6 (mimeographed).

The report is mainly concerned with the results obtained in the crop production drives. It is noted as of possible future interest that cacao areas abandoned through swollen shoot disease and other causes in the oil palm belt at Krobo have shown extensive regeneration with oil-palms, which now fill large areas of former cacao land. Rubber production fell to about three-quarters of that of the previous year, chiefly because of the lessened production of *Funtumia*, the trees not having sufficiently recovered from the drastic tapping of the previous year. Cacao production is at its lowest and the plantations are generally neglected because of low prices and the knowledge that the Government will purchase the crop only to burn it to a large extent, nor could the cacao farmers compete with the high wages labour obtained for other activities. Swollen shoot is spreading rapidly in the main affected areas but shows signs of being checked on the perimeters. Control work ceased in May 1943, the staff being transferred to rubber survey. During April and May, 13,475 trees were cut out in Kwahu.

377. GOLD COAST, CENTRAL PROVINCE. 633/635(667)

Annual Report of the Central Province, Gold Coast for 1943-44, 1944, pp. 22 (mimeographed).

Rubber. The tapping of everything tappable was continued. Notes are given on the production of Para and *Funtumia* rubber. Production of paste rubber ceased and tappers had no interest in *Landolphia* and *Ceara* rubber, because the poor results did not provide a living. *Cacao*. Production has been low through lack of interest, the tardy announcement by the Cocoa Control of the prices to be paid, and the labour problem. An attempt to establish an experimental cacao farm at Abenase failed as the result of *Sahlbergella* attack. *Citrus*. A research programme on

citrus was drawn up and work is to be started. Many citrus trees are dying at Asuansi. Psoriasis, not hitherto reported from the Gold Coast, is suspected and trials are in progress. Rootstock trials have begun and include species of the native *Rutaceae*. Lime farms continue to deteriorate rapidly when they reach the stage of branch interlocking, thus forming a canopy. Steps are being taken to improve the present very low standard of cultural practice. *Coconuts*. In spite of the high prices for copra offered by the Copra Control farmers were not interested, since they got more profit from local sales of fresh nuts, dried nuts and coconut oil. *Bananas*. The crop was revived with the advent of American units. Until then, after shipping facilities had ceased, no attempt was made by farmers to keep the groves healthy. *Food crops*. The situation is sound, prices have dropped to more reasonable levels with increased production. *Tobacco*. The recent import of large supplies of South African tobacco, the difficulty of obtaining a market and the better return from other crops have caused farmers to lose all interest in tobacco. *European vegetable gardens*. Fresh seeds of varieties suited to the tropics gave good results. There was over-production owing to supplies grown for the military being left on hand through removal of the war zone from Africa. Beet and carrots were not a success on account of attacks by *Cercospora beticola* and *Macrosomus carotae* respectively. Cabbage suffered from *Erwinia carotovora* (stem rot).

378. GOLD COAST, WESTERN PROVINCE. 633/635(667)

Annual Report of the Western Province, Gold Coast, 1943-44, 1944, pp. 12 (mimeographed).

Banana industry. A change of policy in regard to treatment of Panama disease was instituted and 34 diseased farms and 46 healthy farms in diseased areas were dug up. To avoid such destruction farmers are cutting down diseased plants without reporting them. *Coconut industry*. A change of policy was initiated in that farmers are no longer to be encouraged to plant seednuts, though, if anyone wished to plant on his own initiative, he was to be helped. The reasons are the large number of palms already existing, the shortage of labour and of easily available land for food production. High transport charges held back the production of copra, but this difficulty was later overcome and sales rose steeply. *Cocoa*. Swollen shoot disease is spreading slightly. At Unit Virgin Cocoa Farm *Sahlbergella theobromae* is so bad that 6-year-old trees are only 4 ft. high and only 12 pods were produced on the whole farm. Local farmers contend that old trees do not require shade. *Foodstuffs*. The systems of haphazard buying and partial control did not maintain regular supplies for reasons explained. An efficient control system later established is fully described. Western Province imports nearly all its foodstuffs and even palm oil, although this is locally produced. However, a healthy export crop of rice has developed in recent years due to the satisfactory price which enables remote farmers to produce at a profit. A drive for palm kernel production was started and a large number of villages have been allotted a compulsory production quota. The idea of rotational crop farming is new to the local farmers and endeavours are being made to interest them. *Rubber production*. Figures showing the monthly production are given. The report of the rubber production officer is attached.

379. INDIA, IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH. 633/634(54)

Annual Report of the Imperial Council of Agricultural Research for 1942-43, 1943, pp. 38, 4s.

The report, unlike those of previous years, contains no experimental results of interest to this Bureau.

380. INDIA, IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH. 633/635(54)

Annual Report of the Imperial Council of Agricultural Research for 1943-44, 1944, pp. 44, 3s.

This brief report has to cover the whole of Indian agriculture

and only one page is allotted to horticulture. Schemes of plant and marketing improvement are in operation in 2 named provinces which have horticultural stations in being. Schemes initiated during the year are (1) citrus trading, Madras, (2) citrus dieback diseases, Bombay and C.P., (3) the cytogenetics of mango and banana, Calcutta University. Work is proceeding in Kashmir on San José scale and at Lucknow University on mango necrosis. The Bombay research on the cytology of papaya has terminated with the conclusion that the course of necrosis is the same in all three sex types of papaya and that there are no visible morphological differences between the chromosomes of the 3 types. The fruit and vegetable preservation scheme at Lyallpur has dealt chiefly with fruit juices and with packing materials. Fifteen vegetables showed greater loss of vitamin in sun-drying than in artificial dehydration. A standard method of roasting groundnuts has been evolved costing Rs. 500 per ton. Work on fruit canning and fruit juice preservation is in progress in Baluchistan.

81. MADRAS. 633/635(548.5)
Reports of subordinate officers of the Department of Agriculture, Madras, for 1940-41 1942, pp. 178, Rs. 4.8.0.

These reports of the specialist officers of the Madras Department of Agriculture centred at Coimbatore contain only a few paragraphs dealing with horticultural experiments. Any significant results obtained have already been reported in *H.A.* from other sources.

82. NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING. 631.3
Annual Report of the National Institute of Agricultural Engineering for the year ending Aug. 31st 1944, Askham Bryan, York, 1944, pp. 15, 3d.

One of the general problems which is being studied at Askham Bryan and is of particular interest to horticulturists is that of bringing tractors and their associated equipment more into line with small farm requirements. In many cases now the Institute is working not so much on the production of new implements as on the working out of mechanisms for particular purposes and on the study of underlying principles. Among problems under study are the handling of dung; segmentation of sugar beet seed and the reduction of singling labour with this crop; sugar beet harvesting technique; potato planting and harvesting. At the request of the Agricultural Research Council a machine has been designed and constructed for use in experimental work on fertilizer placement.

83. NEW ZEALAND DEPARTMENT OF AGRICULTURE. 634/635 + 664.84/85(931)
Annual Report of the N.Z. Department of Agriculture for 1943-44, 1944, pp. 16, 6d.

The report of the Horticulture Division appears on pp. 14-16. Climate during the year was unfavourable, with periods of excessive moisture and drought tending to depress fruit production. *Pests and diseases.* Codling moth was bad in the north as the result of high summer temperatures. Brown-rot was particularly bad in the Central Otago district. The incidence is also noted of black-spot, citrus blunker, fireblight, spotted wilt and other viruses of tomatoes, diamond-back moth and white butterfly, bacterial spot of plums and ripe spot of apples. *Experimental work.* Warmer restrictions have continued and only a few existing trials, e.g. those on rootstocks, varieties, filberts and ripening control have been continued. An important experiment, the results of which are not yet available, was the dipping of stone fruit in a fungicidal solution with the object of inhibiting the development of brown rot. Trials on the ry-heat storage of onions were again successfully undertaken and are being continued. *Citrus production.* Estimated totals for 1943 in New Zealand are lemons 108,300 bushels, New Zealand grapefruit 50,100 bushels, sweet ranges 9,800 bushels. *Processing.* Considerable success

has been achieved in the dehydration of apples and several varieties of vegetable. *Market gardening.* The industry is now on a sounder basis as the result of the Commercial Gardens' Registration Act 1943. *Viticulture.* The building of wineries, cellars and distilleries is taking place, especially in the Hawkes Bay, Waikato and Henderson districts. The Horticultural Station at Te Kauwhata continues to make progress. The area under grapes there is being extended. *Tobacco.* The acreage planted is maintained at about 3,000 acres a year. *Hops.* The area under cultivation remains at about 650.

84. NIGERIA. 634.6(669)
Fifth Annual Report of the Oil Palm Research Station, Nigeria, 1943-44, 1944, pp. 30 (mimeographed).

Establishment experiments. Manurial trials in connexion with the maintenance of fertility of established plantations are being carried out with farmyard manure, wood ash and lime, artificial manures being unobtainable. Control over more African-owned plantations has been secured for yield recording with a view to future cultural and manurial experiments. A third type of seed in addition to the thick \times thick-shelled and thick \times thin-shelled crosses has been obtained. In this the thick-shelled female is crossed with *pisifera* as is done usefully in the Belgian Congo. In cover crop experiments the best growth is still shown by young 3-year palms intercropped with corn, the corn yield, which follows 3 years of yams, being exceptionally good. No manures were given. Low weed cover has produced palms with significantly more leaves (at 3 years) than has leguminous cover; if these results are maintained, the expense of a leguminous cover may be obviated. The validity of the transplanting methods experiment described in last year's report (*H.A.*, 14: 421) as a guide to field work are now doubtful, since, when the most successful plot method was applied to the field, the heaviest losses ever experienced occurred. This is attributed to the destruction of too many small fibrous rootlets in the attempt to get the long fibrous roots away intact by the use of long pointed sticks. The heavy leaf pruning back to the central spear at planting now also seems ill-advised. Planting with a ball of earth is not possible because of the sandy nature of the soil. Small seedlings from baskets and trays are to be planted on permanent sites without previous nursery treatment. The effect of prepared planting holes was to produce a faster-growing plant. *Ekiadolor.* Plots left in uncontrolled bush showed a drop in yield over the previous year of 3%, but comparable plots at the central station 8 miles away showed a reduction of 28% for reasons not known. *Ogba Farm.* The re-establishment of plantations which had been cut down because the labour and time in climbing the trees had rendered them uneconomic has not been easy. *Nkwele Farm, Onitsha.* The palms treated with wood ash for yellowing disease continue to yield at least 3½ times more than trees under other manurial treatments, the increase being in number of bunches and bunch weight. The active constituent in this wood has not been determined but samples of leaves from healthy or diseased plants have been sent to Rothamsted for spectrographic analysis. Provided the plots are well manured the inter-planting of coco yam is not harmful and the palms benefit eventually from the manure. *Aba.* Heavy pruning of leaves native fashion materially reduced yield over light or no pruning. The leaves are of great value for domestic purposes and are constantly cut. *Ibadan.* After 2 years the effect of 15 tons farmyard manure per acre has been nearly to double the yield over unmanured controls in weight, due to a greater number of bunches. *Miscellaneous.* Various native treatments of the wild palm are being tested singly at different sub-stations to ascertain their effect on growth and yield. Native-treated wild palms look healthier than planted palms maintained according to research station standards, but the effect on yield has still to be determined. Pollen viability trials show that 16% maltose

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is the best germinating medium and that the pollen should be kept in an oven at 30-33° C. for 4½ hours to get reasonable germination. Viability in oil palm pollen is very variable even when fresh, that of pollen from young palms being far less viable than that from older palms. In the open viability will disappear in less than a week. In seed viability trials stored seed remained viable for 12 months, bush seed remained viable for 31 months. There was no difference in germination in seed from fruit from the inside and the outside of the tree or between seed left on the tree till it dropped and that harvested just before complete ripeness. Many other experiments are still in progress.

385. PENNSYLVANIA. 633/635(748)
57th Annual Report of the Pennsylvania Agricultural Experiment Station for 1943-44, 1944, pp. 40, being *Science for the farmer*, Bull. 464.

Notes in popular form are given of work in progress by station scientists. *Orcharding*. Among other investigations those on different cover crops are worth noting. Ladino clover shows great promise. Fine grinding was found to improve the scab control properties of sulphur. New sprays for apple pests are under trial. Cryolite proved a good control for fruit fly. *Vegetable and flower growing*. Irrigation is proving its value. Rust resistant varieties of antirrhinum have been evolved by breeding. Mushroom house flies were effectively controlled by aerosol bombs (lethane 384 dissolved in methyl chloride). A list of publications by members of staff is given.

386. PUERTO RICO. 63: 556.566.1(729.5)
Annual Report of the Puerto Rico Agricultural Experiment Station, Rio Piedras, for 1942-43, 1944, pp. 59.

The report covers a large number of experiments and trials. Bunchy top of papaya cannot be correlated with soil deficiencies. Studies of methods of transmission, should a virus be the cause, are continuing. Manganese has been found toxic to pineapples in solution cultures, the effect being related to the absence of iron. Some evidence appeared that boron, aluminium, copper and zinc may also induce chlorosis in the absence of iron. The favourable effect of iron was expressed in early flowering. A dressing of paraffin emulsion was found superior to melted paraffin wax for dressing budwood for storage before budding. The effect of growth substances, including dichlorophenoxy-acetic acid for rooting coffee cuttings was disappointing. In a trial of coffee pruning systems the Colombian system gave the highest yields with the Guatemalan system next and probably overtaking it. The Colombian system consists of topping the tree at 1.40 m. high, removing all suckers and leaving only a main stem with lateral branches, which are pruned at the tips to form an umbrella-like tree. The Guatemalan system is to bend the seedling one year after planting to form an arc. Of the numerous suckers which develop on the curve 3 or 4 vigorous ones are retained. Later the stem is stopped at the end of the bend and the suckers allowed to grow freely. The Costa Rican system tops the seedlings at 40 cm. and the pair of laterals below the cut are also suppressed. Two verticals will develop from the cut and these will be cut again at a height of 1.40 m. [whether from ground or from point of union with verticals is not stated.—*Ed.*]. On poor soils no further cuts are made but on rich soil another cut is made 60 cm. higher; thus 8 verticals are formed from a single stem. There is no further pruning except the annual removal of dead or unproductive branches. The Puerto Rican system of leaving the tree to develop naturally did not compare badly with these pruning systems. After one year no significant results were obtained in experiments to determine the effect of light on the utilization of nitrogen by coffee. In acidity tests coffee made most growth in solutions of pH 4.5. A pH of 6.5 and 7.5 produced poor growth. In seed storage tests pepper, tomato, egg plant, cucumber, onion, radish and lettuce seeds lost their viability in 6 months when

stored at relative humidity 80% and with temperatures above 68° F., whereas with lower R.H. and lower temperatures all seeds except lettuce showed increased germination. The optimum storage temperature for the seeds tested was 50° F.

387. QUEENSLAND ACCLIMATISATION SOCIETY.

551.566.1(943)
The seventy-eighth Report of the Queensland Acclimatisation Society from 1st April 1943 to 30th June 1944, Brisbane, pp. 6.

War restrictions have not yet allowed of the erection of the necessary buildings at Redland Bay. The production of certain medicinal plants has been tried:—*Citrus colocynthis*, *Mentha piperita*, two *Sesamum* spp., liquorice, *Ephedra*, *Capsicum*, *Hyoscyamus*, *Pyrethrum*, ginger and *Canavalia cuiusim*. Notes are given of the custard apple and avocado orchards, mangoes moved from Lawnton, papaws and sugar cane.

388. TANGANYIKA TERRITORY. 633.73(678.2/9)
Tenth Annual Report of the Coffee Research and Experiment Station, Lyamungu, Moshi, for 1943, 1944, pp. 9, 6d.

Conclusions from the result of experiments are as follows: Opening up holes 3 months in advance of planting seedling coffee plants and refilling in good time to allow the soil to settle is superior to other methods. Planting at nursery level continues to show advantage over deep planting. No significant difference was found between bare-rooted and balled coffee seedlings as regards future progress, nor between subsoiling or adding compost to the planting holes. In a mulch, compost, and nitrogen comparison nitrogen seemed to depress yield. No other conclusions were drawn. The best three methods of six tried for the conversion of single to multiple stems as judged from plants converted in 1940 are—(1) cut off west side primaries, leave 3 suckers from bottom; (2) cut off east side primaries, leave 3 suckers from bottom; (3) cut off all except top 3 primaries, leave 3 suckers from bottom. The least successful methods were Agobiada, cutting the top at 3 feet, and stumping. Over a 6-year period Kents coffee has yielded rather more than Bourbon. In nursery selection experiments the mean yield of 6 years was significantly better for seedlings chosen for good tops and good roots over seedlings with tops cut back or with poor tops, or with both poor tops and poor roots. Banana mulch and guinea grass mulch still maintain superiority over other treatments. The irrigation and mulching experiments have given spectacular results which may have a profound influence on coffee culture in East Africa. For example, no irrigation, no mulch produced a mean over 2 years of 1.81 clean cwt. per acre, while 4 in. a month (rainfall + irrigation) + 50 lb. banana trash mulch once a year produced 7.85 clean cwt. The general trend of increases in yield appears to be directly as the increase in amount of mulch and/or irrigation, with the exception of fortnightly applications which seem to be too frequent. The experiment will be fully discussed in a special paper. A number of experiments including those here mentioned are still proceeding.

389. TANGANYIKA, DIRECTOR OF AGRICULTURAL PRODUCTION. 551.566.1: 633/635(678.2/9)
Specialist and research work of Department of Agriculture, Tanganyika Territory, 1943, pp. 35 (mimeographed).

This paper contains abbreviated reports of the Ukiriguru and Lubaga Agricultural Stations, of the Morogoro District Cotton Plots and experimental work on cotton in Kilosa District, of the Dodoma Tribal Farms and Agricultural Station and minor Experiment Stations, of specialist officers and of the Sisal Experiment Station, Mlingano. Much of the work deals with cotton and grain crops. The Plant Pathologist's report consists mainly of a record of diseases. At Lyamungu three sprayings with Perenox (cuprous oxide)

kept a potato crop free from blight, although it was severe on unsprayed plots. The Entomologist deals mainly with locust attack. The Sisal Experiment Station reports some results of experiments. A high standard of cultivation leads to a shortening of the cycle with a consequent increase in the annual yield of fibre. Intercropping with maize, cotton or beans for the first 2 years prolonged the cycle without reducing total yield of fibre, an effect similar to that of moderate weed growth. A reduction in yield was caused when 2 suckers per plant were allowed to develop after the first cut. Interplanting with bulbils had the same effect. Unrestricted sucker growth *within* the rows up to the first cut retarded development and markedly reduced yields. These expedients are aimed at establishing sisal for its second cycle and judgment cannot be given until the results of the second cycle are known. The closer spacings progressively retarded poling. Thus densities up to 5,000 plants per hectare had finished poling after 89 months, whereas with a density of 10,000 plants per ha. less than a quarter had poled by the 91st month. The higher the density of plants the greater the yield of fibre per hectare, ranging from 5.34 tons (1,666 plants per ha.) to 23.79 tons (10,000 plants), but with the latter density there was a reduction in leaf size. Cutting early in the life of a plant of common and blue sisal gave substantially higher yields per plant than delayed cutting, i.e. cutting at 2 years is more profitable than at 4 years. Frequency of cutting trials at 6, 12 or 18 months did not give definite results. Severity of cutting had no effect on yield. Manurial trials on land which has already carried one cycle of sisal are so far without result. Variety trials are inconclusive as yet except that *Agave cantala* only yielded half the amount of fibre produced by *A. sisalana*, *A. amaniensis* or *A. fourcroydes*.

In planting material trials with *A. sisalana* it appears that suckers outyield bulbils in one case by more than 2 tons per ha., but in the other there is no difference because the suckers made such slow growth that much leaf was lost through senility. Size of bulbils at planting was immaterial but the smaller suckers seemed preferable. Trimming the roots and lower leaves at planting retarded growth but increased yield over untrimmed plants. The Raffray decorticicator tested had a capacity of 0.92 tons of fibre per 10 hr. shift. There was excessive loss of fibre and the machine had a high rate of depreciation. Very brief notes are given by the Plant Pathologist of the incidence of disease in fruit trees. It may be of interest to note that a yellowing of grapefruit leaves yielded to treatment with zinc sulphate.

390. UNITED PLANTERS ASSOCIATION OF SOUTHERN INDIA (U.P.A.S.I.). 633.72

Annual Report U.P.A.S.I. Tea sci. Sect. 1942-43, 1943, pp. 24, and *1943-44*, 1944, pp. 11.

Very brief reports are given of work done by the Scientific Section, including separate reports from the Mycologist and Entomologist for the years in question.

391. The following reports have also been examined: (4)

A.R. Dep. Agric. Cyprus for 1942, 1943, pp. 4. 3 piastres.

A.R. Dep. Agric. Dominica, B.W.I. for 1943, 1944, pp. 9.

17th A.R. agric. Res. Inst. Northern Ireland, Hillsborough, 1943-44, 1944, pp. 35.

Rep. Dep. Agric. St. Lucia, B.W.I., 1943, 1944, pp. 17, 6d.

